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HARPER'S WEEKLY

INDUSTRIAL SERIES

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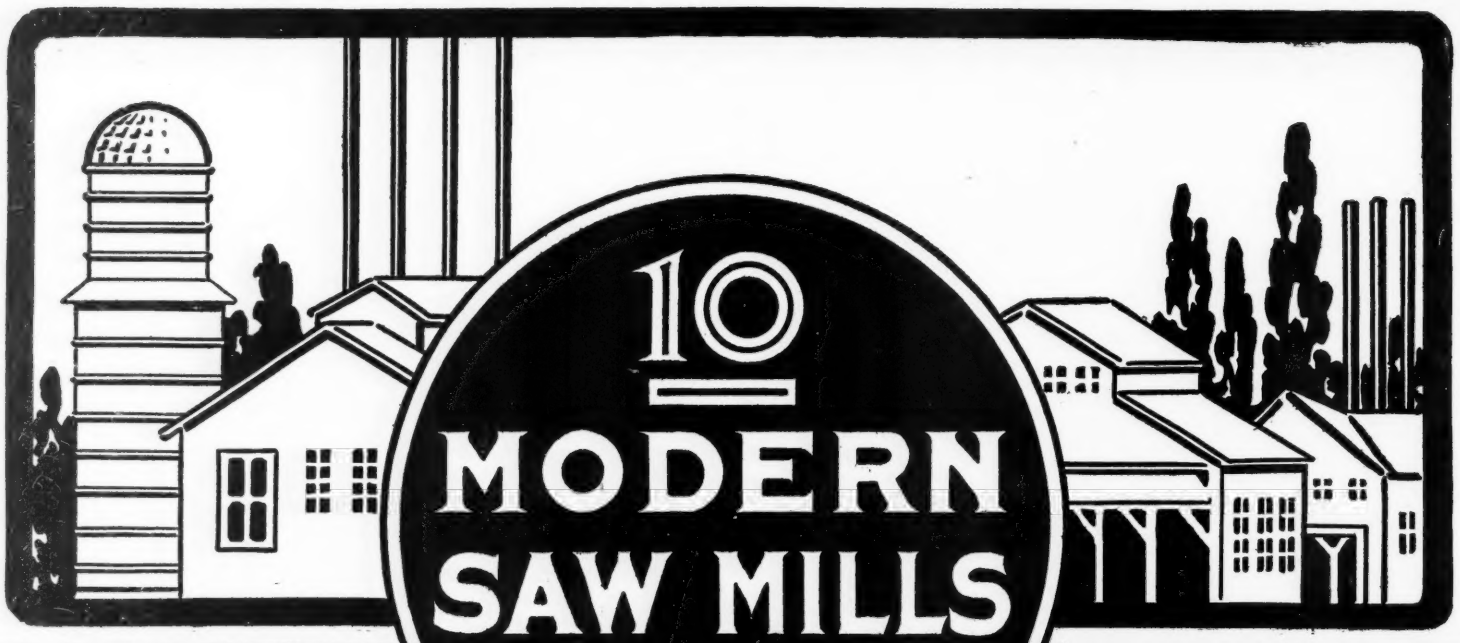

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REMEMBERING THE "MAINE"

The battleship "Maine" and her dead were commemorated on Decoration Day, in New York City, by the unveiling of an imposing monument which has been erected at the southwest corner of Central Park. Ex-President Taft, Governor Sulzer, and Mayor Gaynor were among the speakers of the day.

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COMMENT

BEGINNING with the issue of August 16th, Mr. NORMAN HAPGOOD will take direct personal charge of HARPER'S WEEKLY.

As to the President's "Lobbying"

The real objection to the lobby investigation remains precisely what it was: it may cause unnecessary and unessential delay. On the other hand, few of us are in a position to say positively that the delay *is* unnecessary or unessential. On the contrary, the final show-down on expected amendments and on the passage of the tariff bill may prove that the President was right and that his move was the only way to hold in line enough votes to reject dangerous amendments and to get the bill into conference substantially unaltered and in shape to fulfil Democratic pledges and test the low-tariff theory.

Senator TOWNSEND, of Michigan, Republican, has given interesting support to this view of the matter. He has declared that the President, by his statement in reference to the lobby, has held in line Democrats who might otherwise have voted against certain main provisions of the bill, if not against the measure as a whole. In other words, he has indicated his belief that the President's action may have saved the bill from mutilation or defeat.

Of course, at the same time, he called the President a lobbyist—the worst lobbyist in Washington—and was indignant at the growth and open exercise of executive influence.

That's as it may be. The President is leader of his party, and it is inconceivable that he should not try to exercise much influence over it. In firmly asserting his leadership, in openly attacking whatever influences there were that opposed, openly or insidiously, his and his party's policy, he was within his right, he was breaking no precedent whatever. To say that he was "lobbying" is absurd; quite as absurd as to call a British premier a lobbyist for rallying his following in Parliament or to blame a general for any measure he may think necessary to hold his men in line on the battle-field.

For Higher Education in the South

Another million for a Southern college!

And again we are quite confident that no other part of the country will regret to see this fresh sign of the turning Southward of a reasonable part of our American generosity to colleges. This time the beneficiary is Trinity College, Durham, North Carolina. Most of the money comes from the DUKE brothers, natives of that region, and who there began their remarkable business career; but a substantial part comes from the Rockefeller Foundation.

Fairly Good Going with the Tariff

We see no reason to be discouraged about the tariff bill. True, we should like to see it moving along faster toward final enactment. We want business to begin as soon as possible its actual experience of the new order which the bill will bring about. We want the country to begin as soon as possible to study the actual working of a really low tariff—something that few Americans now living have ever seen. For we are steadfastly confident that a low tariff, framed on sound principles, will, if it is only kept in operation long enough, prove the best of low-tariff arguments. We believe the UNDERWOOD bill, if enacted soon enough to give it a safe life of four or five years, will be to the next tariff revision what the WALKER bill of 1846 was to the bill of 1857, concerning which SUMNER said that practically all classes, including the manufacturers, were content with it as an extension of the low-tariff principle.

We have that feeling as to the extreme advisability of wasting no time. But we are not so unreasonable as to demand that the Senate renounce its function and pass the bill without any real consideration whatever. That was not to be expected. Moreover, trusting the newspaper reports, we are actually pleased with some of the intentions of the Senate Finance Committee and its subcommittees. Frankly, for instance, we never could see any good reason why, if flour and oatmeal and meats are to go on the free list, there should be a duty on cattle and wheat and oats. That would not be logical; it would not be in accord with Democratic doctrine; it would not be just. As we have indicated, the protest of the millers and others against it seemed to us entirely reasonable. We are glad to believe that the protest has been heeded, and we are particularly glad to believe, according to the latest reports, that the remedy is to be, not a duty on flour and oatmeal and meats, but free wheat and free oats and free cattle. That, we take it, is not only adherence to principle, but also candid acceptance of present conditions in respect of grain-growing and cattle-raising in this country. It is all right, whether it comes from the Senate committee or the President.

We feel equally free to say that we find nothing unreasonable in the proposed Senate changes in the administrative sections; and we are certainly not displeased with the announcement that the Senate amendments, taken together, will probably yield a lower average rate of duties than the House bill fixed. If that is true, then we will have attained not merely a new tariff bill, but a new process of tariff-making. For every tariff we remember has left the Senate higher than it came from the House, and has again been raised in conference.

No, we are not discouraged; and we are only too glad to praise the Democratic Senators, including SIMMONS, who, whatever their past records, seem now to be resolutely minded to keep faith with WILSON, with their party, and with the country.

An Alien Enterprise

Senator HITCHCOCK's amendment, proposing a graduated tax on the larger producers of smoking-tobacco, cigars, and snuff, is another matter. We do not understand that the Senate Finance Committee, or any of its subcommittees, has accepted it. Neither do we find as yet anything to indicate that the President is at all committed to it. So far as we can see, it merely embodies an idea of Senator HITCHCOCK's own and a suggestion of Attorney-General MCREYNOLDS to remedy by legislation the supposed lack of effectiveness of the Supreme Court's decree dissolving the tobacco trust.

It is a matter, therefore, for separate discussion—and for far more deliberate and full consideration than this paragraph permits. It involves questions of fact not to be hastily dealt with; whether, for instance, the bigger of the surviving tobacco companies are actually crushing out the competition of the smaller independent companies, and by improper methods; it involves the old question of how far mere bigness is of itself objectionable in corporations; it involves a lot of things that ought not to be hurriedly decided. Above all, it involves the question, never before so squarely raised, if raised at all, whether government must yet use the taxing power—which Senator HITCHCOCK frankly remembers is the "power to destroy"—as an adjunct to its other legislative endeavors to regulate "big business" justly.

Because it does raise such big issues as these, we strongly oppose any such amendment to the tariff bill. We pass no judgment on the ideas of Senator HITCHCOCK and Mr. MCREYNOLDS. We have no doubt there is much sympathy with the objects they have in mind. On that score we ourselves are not unsympathetic. But the tariff bill ought not to be complicated with or imperiled by such an unnecessary addition to the troubles of the men who are fighting for it. The HITCHCOCK amendment should take its chances as an entirely separate measure. It can then be discussed on its own merits. The announced purpose of the President and the party in power is to enact a tariff "for revenue." They ought not to be asked to pass a tariff to amend or supplement the SHERMAN law, or to correct a Supreme Court decision. Their initial job is big enough as it is. Let us not enlarge it with other designs, however worthy.

Not Too Sociological, Please

Senator BORAH has introduced an amendment to the tariff bill which would bar from entry all goods manufactured wholly or in part by children under fourteen years old, or by children under sixteen who are required to work more than eight hours a day or more than forty-eight hours a week. It would also bar all imports made wholly or in part by convict labor.—*Washington Despatch.*

We suppose the Senator's intention is to protect American labor from the competition of foreign child-labor, but there are a lot of desirable things that a tariff bill ought not to undertake, and this seems to be one. Moreover, if the custom-houses have to delve too far into the sociology of imports, the revenue will be eaten up in investigation. *De minimis lex not curat* means tariff law, too.

Paterson and the I. W. W.

The I. W. W. at Paterson is a symptom, not a cause. Mr. GREGORY MASON gathered the facts of the industrial situation in that city in an article in the *Outlook* last week. The strike in the silk-mills began, he says, when, in January, "the employees of the DOHERTY mill, enraged at the installation of the four-loom system, by which each weaver's work was doubled without a corresponding increase in wages, left their places and struck." But for long before that the silk-weavers had been much disturbed in their minds, and as there are 293 silk firms in Paterson, it was a serious disturbance, for the example of the DOHERTY mill, under the stimulating supervision of the I. W. W., brought 25,000 silk-workers out, and they have been out ever since.

The trouble seems to be the common one of improvements in machinery which, under competition, have borne harder and harder on operatives. The story as Mr. MASON tells it is that twenty years ago a high-speed loom was perfected that could be run by women. Forthwith factories were opened in various cities of Pennsylvania where the men work in coal or iron, and many women are available for employment. In Paterson silk-making is an old industry, but the competition of the cheap-labor mills in Pennsylvania drove the Paterson manufacturers to like expedients. "Women came into the mills of the Jersey town and wages dropped."

Now as to the four-loom system, Mr. MASON says that fifty years ago each weaver operated a single loom eighteen inches wide. Gradually by improvements in machinery and possibly by developing a higher standard of exertion, workers have been given two, three, and now four looms to run, and the width of the looms has been doubled. So a weaver now under the four-loom system produces as much as eight men produced fifty years ago.

That is a splendid triumph for invention and machinery, but the workers seem to be worse and worse off. The competition in silk-manufacturing is sharp. If wages are low in Pennsylvania, Paterson cannot compete successfully with Pennsylvania and pay high wages. If appeal is made to the legislature of New Jersey, what can it do? Can it regulate wages? And if it could, could it regulate the competitive wages in Pennsylvania and other states?

It will be seen that here is a situation difficult of reasonable settlement. There cannot be, under our present system of government, a federal law to fix the standard of wages and hours of labor in the silk industry. If the manufacturers combined to do it the SHERMAN anti-trust law would probably catch them.

And that is a pretty common situation. Reasonable people inspect it, and wring their hands, and go back and sit down. Along comes the I. W. W., which is not reasonable, which has an impossible industrial theory, cares nothing for states' rights or the SHERMAN law, has not been bred to any sacred awe of machinery, but has a very lively concern for human workers, and sympathy and eloquence and indifference to cops and prisons. The I. W. W. takes hold of this situation, which palsies law and flouts argument, and does what it can. Largely it raises hob, but considerably it relieves—for it gets money—and it gives leadership and keeps the strike together.

Women in Industry

The element of women's labor in this silk-mill difficulty is interesting. A very wise woman said the other day: "I do not care anything about votes for women. The great peril that concerns them is industrialism, which is drawing them by the thousand away from their natural duties and vocations. Who can do the work these women leave undone? What can make up to the country for the loss of their services as mothers and trainers of families?"

Who is ahead on the wholesale employment of women of the coal districts of Pennsylvania in silk-mills? Perhaps some manufacturers are the richer for it. Possibly silk is cheaper to the consumer or more profitable to the merchant because of it. But see the result in Paterson, see the effect on labor, wages lowered, human life cheapened, competition intensified, men diminished in their power to support families! And since this sort of thing has been going on in all sorts of industries, and more and more lives of women have been sucked in, and human endurance has been stretched farther and farther on the industrial rack, the cost of living has mounted up, up, up, and discontent has waxed apace.

Of course there are compensations. A great

many women get wages and like them, but it is as President WILSON said in his inaugural:

> We have been proud of our industrial achievements, but we have not hitherto stopped thoughtfully enough to count the human cost, the cost of lives snuffed out, of energies overtaxed and broken, the fearful physical and spiritual cost to the men and women and children upon whom the dead weight and burden of it all have fallen pitilessly the years through.

Women, Babies, and Work

Last week in the French Chamber of Deputies there was a discussion about the protection and encouragement of motherhood. We read:

> Deputy FERNAND ENGERAND, in proposing a measure to compel employers to continue paying the wages of working-women during four weeks in case they are absent from their employment owing to motherhood, said that France and Turkey were the only European countries in which motherhood was not protected. The death-rate among children who were put out to nurse in France was, he said, sixty per cent., while among children nursed by their mothers it was only twelve per cent.

What does four weeks amount to to a nursing mother? To something, no doubt, but of course it is not nearly enough. Does France expect to get her population maintained and her armies recruited by the efforts of women who go out to work, and bear children in the brief intervals of their wage-earning labors?

Monstrous! We commend to the Deputies this discourse of last week before a committee of the Missouri Senate, between Lieutenant-Governor PAINTER, of Missouri, and Mrs. ROBINS, settlement-worker of Chicago and president of the Woman's National Trades Union League:

> Lieutenant-Governor PAINTER said that the attitude of the Trades Union League in urging girls to concentrate in the city is destroying home ties and subjecting women to conditions worse than those of the negro in slavery.
>
> Mrs. ROBINS said that women in industry were slaves, but she said they ought to enter the gainful occupations and be paid a proper minimum wage—$12 a week or more.
>
> Mrs. ROBINS said that women enjoyed being among the multitude, preferring that to the home. She said her purpose was to make women rebellious so they would demand more pay and better working conditions.
>
> "Has not women's employment in the industries enforced women's slavery in this country?" asked the Lieutenant-Governor.
>
> "Yes," said Mrs. ROBINS.
>
> "And are not women workers more firmly in bondage than were the African slaves, who were valuable to their owners and properly cared for? Do not employers now know that when they wear out one girl they can get another to take her place?"
>
> "Yes, that's true," said Mrs. ROBINS.
>
> "If women were taken out of the industries and lived at home and took care of the families, would they not be better off and would not the men then get higher wages and be better able to provide for their families?"
>
> "Every woman is entitled to work," replied Mrs. ROBINS.

Yes, every woman is entitled to work; but to bear and raise children is work, and ought not to be too much complicated with employments that conflict with it.

Thought Will Still Govern

> THURLOW WEED was the grandfather of WILLIAM BARNES. When New York proposed in 1821 to establish manhood suffrage Mr. WEED was one of the most active opponents of the amendment. Sixty years later he frankly confessed that he had been mistaken and that none of the evils which he feared had resulted from the establishment of a genuinely popular government. If grandfather was so decidedly wrong on a vital question of votes, grandson may be equally wrong on a question of nominations.—*The World.*

Possibly THURLOW WEED'S final conclusion was that it doesn't make much difference who votes, provided the voter is accessible; and perhaps Grandson BARNES'S conclusion may finally be that it doesn't make much difference what voice nominates. Thought taken beforehand will doubtless produce effects in politics as heretofore, no matter what improvements may be made in the machinery of nomination.

False Economy with Judges

There is little or no difference of opinion to be found in the very widespread comment on the resignation of Judge NOYES, of the Second Federal Judicial District. Those who know about Judge NOYES agree that he is a very good judge indeed, and that the bench will be weakened by the loss of him. Those who know about living conditions in his district, which extends into New York, Connecticut, and Vermont, agree that his sole reason for resigning—the insufficiency of his salary—is a perfectly good reason. Everybody seems to agree that our government is at fault in permitting such a reason to exist.

Congress is at fault in more ways than one in this matter of judicial salaries. It has failed to take due account of the increase in the cost of living. Twenty years ago that was not, for a man in Judge NOYES'S position, more than half what it is to-day; his present salary of $7,000 is now not nearly equivalent to the $6,000 which circuit judges then received. Congress has also failed to take due account of the differences in the cost of living as between different parts of the country. There are high state judges in parts of the South who seem content with salaries of $3,000 or less; at any rate, high-class men seek and keep such places. On the other hand, nobody seems to think it unreasonable that in New York City Supreme Court justices should have $17,500.

But the main fault of our policy in this regard is general and continuous, and has often enough been pointed out as in contrast with English and other foreign usage. It is simply that we do not pay enough for the difficult and almost supremely important work which we demand from the bench. Our system, state and national, throws upon judges more of the responsibility for its proper working than does any other in the world. That is perhaps its most distinguishing characteristic. Yet no other great nation does so little, whether with money or in other ways, to make the bench attractive to men of the highest ability.

Some of the states are doing more than they used to. There are signs that a general change of policy may be approaching. It cannot come too soon. Whatever may be the merits of other plans to keep the American bench what it has been and should be, and to allay what seems a growing discontent with it, none can be complete or final that does not make it effectively attractive to the very best men we have to put on it. Whatever else we want, we shall certainly always want the best judges we can get. We can afford whatever it may cost to get them. We cannot afford to practise any economy—or to do anything else—that may keep us from getting them.

Commissioner Williams

The resignation of Mr. WILLIAM WILLIAMS as Commissioner of Immigration has been accepted by the President, to take effect on June 30th. The President in a letter expresses his appreciation of Mr. WILLIAMS'S "conscientious and peculiarly intelligent service in handling one of the most delicate and onerous positions in the government service."

It will be a loss to the country when Mr. WILLIAMS leaves Ellis Island. He has been the head of our establishment there for seven years in all—three by appointment of Mr. ROOSEVELT, and, after an interval, four more by appointment of Mr. TAFT. A commissioner at Ellis Island under the immigration laws is sure to be assailed and misrepresented. He will have to make many distressful decisions, and turn back lots of pitiable people from the door of their hopes. It is a heartbreaking job. Mr. WILLIAMS has administered it with firmness, with kindness, with sound judgment, and entire integrity. He has been vilified and assailed a great deal, but wherever his conduct or decisions have been investigated by competent inquirers he has been justified; and usually when his judgments have been overruled on appeal to Washington, the final result has justified his opinion.

We don't like to see Mr. WILLIAMS released from the public service. He has certainly served his time at Ellis Island, but in doing so he has acquired an intimate knowledge of immigration that should continue to be available in shaping the country's immigration policies. We wish he might go to Congress. That is one place where such experts as he are needed.

Liquor Laws that Miss Their Mark

We read that under the present liquor law of Texas action has been begun against a German society in Dallas for selling drinks to its members, and the Attorney-General is going to sue clubs everywhere that keep "gentlemen's cellars."

To start with the Germans seems an ambitious beginning. There are a good many Germans in Texas, some localities having a large preponderance of them. We suppose they drink beer, and drink it in the usual orderly German fashion, and like to drink it in company. We suppose they are about as good settlers and citizens as Texas can hope to get. If the prohibition sentiment in that state harasses them in the enjoyment of life and beer according to their tastes, it will do, we should say, a mischief, and one that in the end will be likely to test the strength of the prohibitive sentiment in Texas. It is not enough for a liquor law that it should mean well. It must do good or die. Moreover, it is not enough for a state law that it should do good in one county and evil in another. It must be so devised as to operate beneficially wherever it operates at all. Local option seems the likeliest way to effect that, and local option in Texas would probably avoid the harassment of the Germans.

If expert testimony is of any worth, the foremost example of a well-intentioned liquor law that has done harm is the anti-canteen law. The army struggles annually to get rid of it, making pathetic showing of its evil consequences, but it sticks.

Racing

There is racing again in these parts, some at Piping Rock and some at Belmont Park. The laws have been modified so as to give the sport another trial, and see whether the gambling element in it can be sufficiently suppressed to avoid damage to the public morals.

Racing seems to be amusing, and there are a good many people hereabout who have leisure to be amused, and are ready to spend money for amusement, and it would be a pity and, we think, a mistake to project laws between them and any diversion which can be made reasonably innocent. If racing can be successfully demonetized it is no worse than baseball. It has the good quality of putting the Puritan nose out of joint. A world in which the Puritan is entirely easy is not an entirely wholesome world, not quite the world the Creator intended.

We hope the new racing will succeed. If it drops back into its former status of an institution by which a few investors made money and a big crowd was touched with the gambling mania and lost money, the new experiment with it will be short-lived. It is essential to its continuance that it shall not be too profitable. It was very much too profitable before, when Governor HUGHES squelched it. When it becomes too profitable it becomes a public nuisance.

Washington and New York

In the latest instalment of Mr. JOHN BIGELOW'S memoirs he speaks of saying to Mr. SEWARD, then Secretary of State, that he had thoughts of choosing Washington as his winter residence. Mr. SEWARD advised him earnestly to do nothing of the kind, saying:

> I would not stay here a day if not in office. There is no society here with which you would wish to be identified if you are not a public officer. You would be put down as a claim agent, or be overlooked by the officials or first-class people, and your position would be anything but pleasant to yourself, still less pleasant to your wife. I always held on to my country home at Auburn, because, come what might come, there I could always be sure of ranking with the first. I would not live in New York City because there one becomes cheap. You are lost in the crowd. By keeping outside of the city I was always a lion in the city.

No doubt Washington has improved in the last fifty years as a place of winter residence for a citizen not in office. The city is much bigger now than in the sixties, and much handsomer and more agreeable; the permanent population is much larger, and includes more people of wealth and more of mental distinction, but the business of the city is still government, and active people not connected in some way with that may find difficulty in employing themselves to their satisfaction there. Mr. SEWARD might not give to-day the advice he gave to Mr. BIGELOW fifty years ago, but Washington is still preferable as a place to retire to after the hard work of life rather than as a field for the unofficial activities of a man with work still to do. One trouble with such a place for the aspiring is that their children, if they are ambitious, must go elsewhere to do their work in life.

That is not the trouble with New York. Mr. SEWARD'S objection to being lost in the crowd of New York was proper enough for him at his age and with his competent fortune and great distinction. He went back to Auburn, and spent so much of his last years there as were not occupied in travel. But Mr. BIGELOW settled back eventually in New York, where he belonged, and lived there very happily and long, and never became "cheap," as Mr. SEWARD said, and never was lost in all the crowd of Gotham.

Not every one is lost in New York. It depends. But nobody retires to New York. Mr. BIGELOW lived here, and lived to be ninety-odd, but he never retired. To the very end he was a factor in the life of the city.

ON MAINTAINING MAKERS' PRICES

An Illuminating Statement of the Right of Manufacturers which Retailers are Bound to Respect

BY LOUIS D. BRANDEIS

The imperative necessity of maintaining the regular manufacturers' prices on articles of wide fame and general use was the theme of the speakers at the annual banquet of the National Association of Advertising Managers at the Hotel Astor, on May 14th. —EDITOR.

MR. LOUIS D. BRANDEIS, who is known throughout the country as an economist, said:

"MR. TOASTMASTER AND GENTLEMEN: You gentlemen must pardon the very kind words concerning me which came from your Toastmaster. They are the result of an old friendship beginning when he was my client in Boston, and one of the first clients that I had.

"In order to preserve and to extend the right which you are discussing this evening—the right of a manufacturer who has given a reputation to particular goods which he creates to fix the price at which these goods should be sold to the consumer—it is necessary to make absolutely clear the reasons why you ask that right, and to make clear also the difference between that trade practice and another class of facts with which the fixed-price policy is often confused.

"I can conceive of nothing more prejudicial to the maintenance and extension of the right of a manufacturer to fix the selling price to the consumer than to rail generally against the provisions of the Sherman Law, or against the attitude of the government in endeavoring to enforce that beneficent statute. The danger to business discussed this evening arises from the fact that men have failed to draw the distinction between a manufacturer fixing the retail selling price of an article of his own creation and to which he has imparted his reputation, and the fixing of prices by a monopoly or by a combination tending to a monopoly.

"And what you as manufacturers need to protect your just right so to fix retail prices, and what you publishers need in order to preserve efficient and generous advertisers, is to draw clearly that distinction, and to frown upon any general denunciation of the law against monopoly.

"If what you desired, and what you purposed doing, were the perpetuation of monopoly, you would have no chance whatsoever, in my opinion, of preserving such right as you now have to make fixed selling prices, or of extending further that right, as I think it should be extended. For the American people are wisely determined to restrict the existence and operation of private monopolies.

"Your position is a very clear one; your aim is directly opposed to monopoly; and your policy one which, to my mind, is extremely beneficent, not only to business but to the whole people. You say simply this: 'That which is specifically mine, that which I create, and the good will which attends it—which was originally confined to my particular establishment,' as Mr. Ingersoll put it, 'but now extends throughout the whole country or, perhaps, throughout the whole world—that is my specific property; I have made it valuable to myself, and I make it valuable to the consumer; because I have endowed that specific property with qualities on which every one who purchases my goods may rely. That certainly is of value to the consumer, as it is of value to the maker.'

"Now, fixing retail prices under those circumstances has in it no element of monopoly. Operating as an independent manufacturer under competitive conditions, you fix the price at your peril. If you fix it too high, one of two things is likely to happen; either the community won't buy it, or, if it does, despite the high price, some other person will come in and share your prosperity, so long as you have a field open to competition, and the price will fall if there is no combination. To so fix the ultimate selling price in a competitive business is not a restraint of trade in any proper case. On the contrary, it stimulates trade, because it gives an appropriate reward to the man who creates; and it is of the essence of trade to make as large as possible the rewards of successful creation. As long as we maintain conditions favorable to competition and the freedom of individual development—conditions which leave the individual's effort untrammeled by superior power—so long may we safely allow men to make what profit they can get from an expectant public, and to exercise the largest degree of liberty in the marketing of their products.

"But the moment that you endeavor by a combination of superior power to close the field to competition or to restrict individual effort; the moment you take away from the people that protection which comes from the incentive in the individual to create, and from the opportunity of the customer to discriminate in his purchases (as you do when you close the avenues of competition), then a grave danger arises to progress in industry and to the general welfare; and it is against such danger that the Sherman Law was appropriately directed. The statute aims to accomplish in part the very thing which Mr. Ingersoll set forth so clearly in his preliminary statement. It seeks to protect the small man against the powerful trust, against the capitalistic combination.

"The Sherman Law seeks to protect men in the right freely to compete and to prevent practices which must result in suppressing competition. It seeks to preserve to the individual both the opportunity and the incentive to create; it seeks to encourage individual effort; and a right in the individual manufacturer of a competitive business to market his goods in his own way, by fixing, if he desires, the selling price to the consumer, is in entire harmony with the underlying purposes of the Sherman Law. But when men combine to form a monopoly, or control a particular line or branch of trade, however good may be their intentions, they necessarily curb individual effort. Under the fundamental laws of human nature and of trade they withdraw incentive from those who enjoy the monopoly, and they narrow the field of human effort by confining leadership to a comparatively few individuals.

"And even where a complete monopoly does not exist, a powerful combination makes it so difficult for others to enter the field that most men are practically barred by the great chances of failure from entering upon so unequal a contest. It is against such conditions that the Sherman Law was directed. That is, the true restraint of trade — restraint through monopoly or combinations tending to monopoly, a condition under which business success is at best temporary, is often delusive and is always purchased at the expense of the community.

"Now, I take it that the effort which was made in Congress last year to limit further the right (as it now exists in respect to patented articles) to fix selling prices to the ultimate consumers and which finds expression in Section 2 of the Oldfield Bill, proceeds from an admirable motive. But though the motive is good and the purpose worthy, the course pursued is a mistaken one. And the mistake arises from the failure to recognize that certain hardships inflicted by conspicuous trusts which do fix prices have not arisen from the fixing of the wholesale or retail prices, but from the fact that a monopoly or combination existed which made it possible to fix those prices at an unreasonably high figure. In other words, it was not the fixing of the price, but it was the power of the great trust behind the price-fixing which was the cause of the hardship which it is vainly sought to remove by Section 2 of the Oldfield Bill. And the way to remove, both the community's anxiety over price-fixing and your anxiety over the effort to limit that right, is to suppress private monopolies and combinations of like character.

"Now, I was greatly impressed with the wisdom of the resolution of which we have been advised by this excellent publication, *The Evening Assassin*—the resolution of the National Retail Merchants' Association, at its annual convention, which appears on the second page of the *Assassin*. [*Laughter.*] That resolution, quite unlike the title of the paper, is distinctly constructive, and it is also instructive; because it draws very closely the distinction for which I am contending. It shows that the fixing of the retail price in and of itself is an aid to competition, preventing, as it does, the extension of the trust and of the chain-of-stores into fields not occupied by them at present. But it goes on and expresses with equal emphasis its protest against monopoly, its protest against that indiscriminate combination to fix prices and to control businesses against which the Sherman Law is directed.

"I think if you gentlemen will direct your efforts to making clear in the minds of our people that distinction, you will not only preserve your individual rights in this respect, but add greatly to the business prosperity of the country. Make clear the distinction between that monopolizing which the Sherman Law seeks to prevent and to extinguish, and that price-fixing which is an incident of the individual development of business and the building up of reputations of goods as of individuals. Take up the work of education on those lines, and you will, I am convinced, succeed and ultimately will get such wise legislation as Denmark has given to her people on this subject."

GOLF VS. PEDESTRIANISM

BY ARCHIBALD CLEEK

WHAT is believed to be a world's record drive was recorded by Herbert Strong, of the Inwood Club, in the open event of the thirteenth annual United North and South Golf championship at Pinehurst, North Carolina. With the wind back of him Strong made the first green on the No. 2 course, a distance of 408 yards.—*Daily newspaper report.*

Another instance of the imminent, increasing menace of ever-lengthening distance in our golf! Where is the thing to stop? Since the noble and uplifting game began to be played in this country, less than a score of years ago, what a tremendous expansion has it undergone! In those primitive days the man who could actually drive a ball two hundred yards was looked up to as a demigod of the links. We copied not only his style and his clubs, but his very walk; tried even to think like him, if so by any happy chance *we* too might be able some day to drive two hundred yards—or at least a fine, splendid, accurately measured hundred and eighty.

Golf to-day is as different from that primitive pastime as a smart, six-cylinder touring-car is different from the ancient, creeping pony phaeton reported by truthful travelers to exist still in the purlieus of Darkest England, where nothing ever changes. The old, clumsy, snake-headed drivers with necks crudely spliced and still more crudely wrapped have given place to the smart, whippy, well-balanced wooden clubs of to-day; the ancient shapeless irons—the clumsy clubs of still more clumsy men—have been succeeded by graceful implements of shining steel as accurate and efficient as surgeons' lancets and as beautiful as the swords of the daimios. Instead of the old solid gutta-percha ball (hard as the head of an 18-handicap man) we have a dainty, intricate, marvelously balanced concoction of finest Para core, wound with silky rubber threads, loaded with quicksilver to make it run true in putting, and cased in a vulcanite shell whose uniform thickness does not vary by the shadow of a millimeter!

As a result we find the game growing steadily longer and longer. The ordinary duffer of to-day tops his ball from the tee and walks out grumbling and cursing to its lie, a mere two hundred yards away—for, thanks to the abolition of cross-bunkers in favor of side-traps, there is nothing to head off such a slovenly shot. If he swings clean and true with his wooden clubs he gets from two hundred and twenty-five to two hundred and sixty yards every time. If he is a good man, like Herbert Strong in the news despatch quoted above—not a champion, or even a runner-up, but a good man—he may lay his drive on the green four hundred and eight yards away.

To what good? Is it all of golf to swipe a ball brobdingnagian distances? What of style? What of accuracy? Above all, where in this land of rapidly growing and congesting population are we to find the room for this sort of golf? The price of beef to-day has soared so high that a good cut of prime roast is worth the ransom of a minor king. Why? Because the old open ranges whereon cattle by the myriads might roam as they willed and fatten on the sweet grasses free of cost have all been taken over, homesteaded, settled by farmers, and inclosed with impregnable wire fences. The free open range has followed the buffalo into the dim and shadowy past. The wide prairie has passed into history. Land is constantly growing in scarcity and in value. If we are going to drive golf-balls four hundred and eight yards, then a hole one-quarter of a mile long (four hundred and forty yards) will have to be reckoned a mere drive and a putt. A "long" hole will have to measure at least half a mile from tee to cup. The golf course of the near future must include twelve thousand yards of playing length instead of the six thousand of to-day. Where is the thing to end?

Moreover, are we to eliminate arm exercise from golf? Or, rather, do we wish to change the game from a full, hard swing once in every one hundred and eighty yards or less to a swing only once in four hundred yards or more? In the good old days of the hard gutty ball the man who had worked his way around eighteen holes had taken a full morning's exercise. To-day that distance has become a mere stroll, punctuated at very rare intervals with a mild swing of the mighty club against the flighty ball. And consider the spirit of the game! When Strong drove that four-hundred-and-eight-yard green his troubles for that hole were over. How much more real golf he would have played if his splendid drive (as full of force and skill as the one we chronicle) had yielded him a mere two hundred yards, his brassey shot one hundred and eighty more, and he had still a pitch or run of twenty-eight yards to reach the hole!

We may safely take it as an axiom that the greater number of strokes absolutely needed in the game the greater the number of opportunities are afforded for skill—or skill's sad opposite. And is it not worth while to have more shots on every hole? Are not the more frequent chances for physical exercise and the display of proficiency grateful to the golfer? Does he derive his chief joy in golf from studying problems, calculating chances, and executing shots—or from mere walking?

THEY MARRIED ON SIXTY A WEEK

Were They Rich or Poor? A Genial Modern Philosopher Answers this and other Questions Relative to the State of being "A Beginning Husband" and Wife

BY LOUISE COLLIER WILLCOX

"MARRIAGE," as one of our greatest novelists has remarked, "is still a great beginning, as it was to Adam and Eve, who kept their honeymoon in Eden, but had their first little one among the thorns and thistles of the wilderness. It is still the beginning of the home epic, the gradual conquest or irremediable loss," etc.

This is not in the least the tone of the reflections of the Beginning Husband, who apparently shares with his author a gay and nonchalant attitude toward life and an unconquerable faith that the universe is amiably disposed toward well-bred and well-behaved people. Not that philosophy, and philosophy of a grave and penetrating nature, is absent from these reflections, but it is a philosophy invariably disguised in wit and chaff, a philosophy which, teaching much that Confucius and Epictetus and Aurelius taught, is yet a little too shamefaced to utter itself gravely.

It is impossible to read this book, witty and amusing as it is, without becoming acquainted with a personality and an attitude toward life.

The Beginning Husband takes a wife brought up to live on an income of twelve thousand and upward a year and persuades her to adapt herself to his income of sixty dollars a week with prospects. But by no means will he admit it as a sordid and depressing undertaking. For he says, as to politics and getting married, "if you wait till you're ready, you can't. It seems as if everything had to be shot on the wing."

Two passages, perhaps, give the general drift of the philosophy of this young husband and his creator. In one he says: "I love old associations and permanence of relation, and my heart is even hospitable to some fixity of condition; but there is plenty to be said in favor of wearing the garments of life loose enough to shed them when they get seriously in the way. One should be enough of a change artist to quit a part he cannot excel in before the scene-shifters shut him out."

Again he says:

"*We* are the standard. We laugh at ourselves, but surely it is a fine thing to have so strong a bent toward toleration of things as they are, and expectation of being pleased with them as they're going to be."

The first passage gives one the note of conservatism, the attachment to the old social order, now so unstable, together with a fine indifferent courage and a general sense that, whatever comes, there will be some fun for the spirit that knows how to make it; and the second emphasizes that world-old philosophy of the Stoics which teaches that, if you can't get what you want, the wise man will want what he gets—and so be even with destiny.

With the merriest and most amiable philosophy of life, then, the young husband recounts his adventures from the moment when he re-engages himself to the lady he had relinquished on account of insufficient means, remarking, "I think meanly of the engaged state *per se*, but I had always rather be engaged to Cordelia than not"—through contemplation of the details of living and keeping house, the relation of things to happiness, the first baby, a discussion of the turbulent woman question, contemporary politics, and the education of girls.

If this book lives, if it is treasured in a number of private libraries and referred to by those who care for reflection and observation, it will not be because it is urgent in expediting the march of events. The old order seems fairly desirable and agreeable to Mr. Martin, and he discusses the affairs of women quite as if more than a third of them here in this very land had not already been forced into self-support, into becoming independent economic factors, responsible for themselves and often for a good many others. Even on sixty dollars a week he congratulates himself that his wife has no "job" except that of

Photograph by Hollinger

Edward Sanford Martin

AUTHOR OF "A BEGINNING HUSBAND"

ministering to his comfort. "*My* need is for assistance in spending our money." All the choices of the young husband turn out as joyously as his own temperament. Fathers and fathers-in-law supply a due amount of country-homes for summer, champagne, and automobiles. Cordelia sings at her work and spends her life "making calls—though she says calls are a queer employment for a lady who lives over a tailor shop—and she goes to see her mother, and my mother, and various girls, and goes to market, and sews a little and reads a little and does charities a good deal, and has girls in to lunch and feeds them on I don't know what. She says it is not wise to break with the life you know any more than you have to."

Again, when it comes to the question of educating girls it is quite definite that the author prefers girls educated for marriage rather than for self-support. College girls, he thinks, are largely recruited from families whose daughters have a doubtful prospect or worse of inheriting means of support. Says his friend Mrs. Van Pelt, at the dinner-table: "The colleges are nunneries full of nuns whose mothers I don't know, busy learning unimportant things like how to cut up frogs, and the pedigrees of the Saxon kings, and eschatology, and neglecting all the important things like how to put on a hat, how to cut up a lobster, how to keep hair attached to the scalp, how to talk to a boy, how to help a mother, how to engage a cook, whom to ask to a dinner-party. Why college? Maria'd come home in four years, forgotten by all the girls she ought to know, qualified to be a school-teacher and with a large acquaintance among young ladies similarly qualified, and with a strong and reasonable impulse to put her acquirements to practical use either by continuing her studies or getting a situation and earning her living. I don't want her to get a situation and earn her living. I want her to get married."

This is not the tone of the modern economic situation. The author says nothing about race suicide in this volume, but the general optimistic tone is of one who thinks well of the human experiment, and yet, if the race is to multiply indefinitely, it will probably be necessary for more and more members of the race to become producers.

However, it is not in the field of social economics that we most admire the Beginning Husband, but in the field of human relations. The Bebinning Husband has a genius for associating himself with nice people. That Cordelia was thoroughly nice as well as wise one sees from her reply to her husband when they were visiting wealthy contemporaries.

"No doubt, Cordelia," said I, "you might have had a set of things like this if you had shown a little timely judgment."

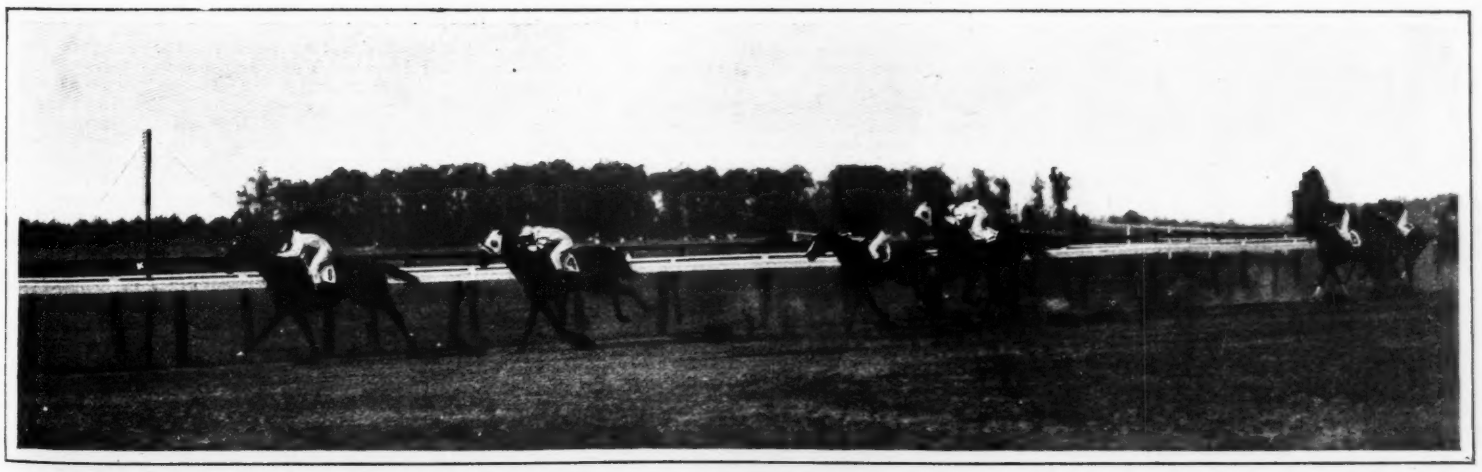
"Possibly," said Cordelia, "this is a nice set, too. How many bath-rooms shall *we* need, Peregrine?"

Of social status as measured by the many bath-rooms in a father's house there are many witty comments. A Long Island house, built to contain a family of three and containing twenty-five of these commodities, sets the young husband to reflecting: "Church unity still hangs back a bit, but we are getting pretty strong on plumbing, and the millennium may find us with a bath apiece."

If in the olden days Addison gave us the picture of the fine gentleman of the early eighteenth century, here is a companion picture of a fine gentleman in an era of tumult when fine gentlemen are perhaps rarer. He has a jaunty manner still, a high heart, a tolerant outlook, fine manners, and a kind heart; while the philosophy of life that he offers, in so gay and buovant a style, is not so unlike two graver utterances that ushered in our era: "The Kingdom of Heaven is within you" and "Seek ye first the Kingdom of God and all these things shall be added unto you."

We should advise every young husband to keep the book near at hand so that he may refer to it when his failures are most apparent, laying to heart the utterance of the young husband's friend. Speaking of women, Major Brace says: "We can't do anything, Peregrine, but try our utmost (of course he really said 'damnedest') to make them happy, and hope that they will be good."

It has been pointed out before that the field which Mr. E. S. Martin has made particularly and happily his own is the domestic field. And once more he has set it before us with the same happy lightness of touch, the same profound wisdom so gracefully clothed, that we smile throughout the book and only realize afterward that we have been led along a primrose path to the underlying gravities of life.



HORSE-RACING "COMES BACK" IN NEW YORK

THE RUNNING OF THE METROPOLITAN HANDICAP AT BELMONT PARK, NEW YORK, ON DECORATION DAY, MARKED THE REVIVAL OF RACING IN NEW YORK STATE AFTER A LAPSE OF THREE YEARS. THIRTY THOUSAND TURF-ENTHUSIASTS SAW HARRY PAYNE WHITNEY'S "WHISK BROOM" ROMP HOME AN EASY WINNER

The click of the reaper is heard around the world

FUEL FOR THE HUMAN ENGINE

BY TRUMAN A. DeWEESE

SUPPOSE a woman should enter a modern grocery-store and say to one of the clerks, "I want seven thousand six hundred and thirty-six calories of food this morning." Or, suppose she should say, "I want thirty-five hundred calories in meat, fifteen hundred calories in vegetables, and two thousand calories in cereals!"

Either request might throw the clerk into a condition of speechless amazement and mental stupefaction. If he sought the owner of the store for information he would get no enlightenment from that source. His reply would be, "We don't have that kind of vegetables, lady."

Or, suppose a woman entered a grocery store and asked the clerk to give her food containing 13.8 per cent. proteid, 71.9 per cent. carbohydrates, 1.9 per cent. fat, and 2.1 per cent. mineral matter, with a total of 1,700 calories. If the clerk made any reply at all he would be very apt to refer her to a drug-store, assuming that she had in mind some patent health food which she had seen advertised in a health journal. As a matter of fact, such an inquiry would represent a knowledge of food values and chemical content which is so far ahead of our times that she could not hope to get any intelligent response to her inquiry. If any one really entered a grocery-store and asked for food in terms of calories, or proteids, or carbohydrates, you may be sure it would be a woman, for women are the ones who are most interested in food values and who are keeping pace with modern progress in dietetics. The mother is the one who bears the responsibility of building perfect bodies for her children. She is studying the food question. The man of the household is apt to be much more concerned about the brand and bouquet of the cigar he smokes, or the warmth or texture or color of the clothing he wears.

Strange as it may seem, we are expected to know something about everything except the science of nutrition. We want to know about the heat units of coal, the horse-power of engines, the volts in electric energy—but few concern themselves seriously about the man-power or heat units in a food.

If we look ahead a hundred years we should easily imagine an intelligent housewife buying food in a store with reference to its calories and its proteid content without exciting any consternation on the part of the clerks. In the mean time, the educational work is going on, and every year witnesses a wider dissemination of information regarding food value and the kind of food that people of certain temperaments and vocations ought to eat. To really comprehend the subject of nutrition it is necessary to think of the human body as if it were a machine. This machine is made up of so many units which are the living cells, such as the liver cells, muscle cells, kidney cells, and other cells, differing in the various organs. These cells are alive, and they may perform movements, as the muscle cells do, or conduct messages to the brain, as the nerve cells do, or they may purify the blood, as the kidney cells do. These cells are always warm, being bathed with a liquid which has the temperature of tropical sea-water. The warm surface of the body indicates the production of heat within, and these heat units are called by the chemists calories. Certain kinds of food taken in the body develop through oxidation a certain number of calories or heat units.

In addition to this, the food contains a certain percentage of proteids for building muscle and repairing waste tissue, a certain percentage of carbohydrates for making fat, a certain percentage of phosphates, or mineral matter, for making bone and brain. If we examine the process of combustion in a steam-engine, we find that power comes from the oxidation of the coal, which yields heat that may be converted into power. In the human being the cause of the motions of life is due to the oxidation of sugar and fat. It is through the power liberated during this oxidation that life is made possible, and it is through this oxidation that the cells within the body are made warm and lifelike.

The question now arises, How much fuel and what kind of fuel are necessary for the proper running of the human machine? In order to answer this, we have to keep in mind the fact that the human machine has within itself the power of growth and self-repair. The steam-engine, which is run by the power generated by the oxidation of coal, does not possess the power of self-repair. The human engine, however, must not only develop a certain amount of heat and energy, but must be able to repair the waste that is constantly going on in the cell machinery. The basis of this cell machinery is proteid. The cells are made of different proteids, and these, together with water and fatty substances, constitute the working machinery of the human body.

To replace the worn-out tissue in the body an equivalent amount of proteid must be given in the food. It is carried to the cells, and it replaces the parts that are destroyed by the wear and tear of our daily life. It has been estimated that a hard-working laboring man requires 3,500 calories daily in his diet in order that he should have fuel for sustaining life and for furnishing energy to do his daily work. It has also been estimated that a family consisting of a father, mother, nine-year-old son, six-year-old daughter, and a one-month-old baby would require every day an average of about eight thousand calories. It has been found by experiments that the average working man requires for the proper and healthful sustenance of his body food that contains so many grams of proteid, so many grams of carbohydrates, and so many grams of phosphates or mineral matter.

Having ascertained all these facts regarding the requirements of the human body, scientific men naturally have been interested in finding a food which seemed to supply all these essentials of a well-balanced nutrition. The history of the human race and the results of experiments for four thousand years have affirmed the fact that the whole-wheat grain is without doubt the one perfect food given to man. Through all the centuries we find that it has been man's staff of life, and neither the chemists nor the wizards of the soil have ever been able to produce a food that supplied in such well-balanced proportion all the chemical elements needed to nourish and sustain the human body.

Scientific men who have made a study of this question are of the opinion that wheat was once upon a time a wild grass, that its original home was in Mesopotamia, and that from there its cultivation extended in very early times to the Canaries on the west and to China on the east. Traces of it have been found among the rocks of upper Galilee, around about Mount Hermon, and it has also been found in a good state of preservation under the cloths wrapped about Egyptian mummies.

On examining a longitudinal section of a grain of wheat with a microscope we are amazed at the wonderful manner in which Nature has provided for the perfect nutrition of the human body. The outer layer is seen to consist of epidermal cells, of which the uppermost are prolonged into short layers to cover the apex of the grain. Two or three layers of cells inside the epidermis constitute the tissue of the ovary and overlie similar layers which form the coats of the seed. Within these is the albumen or endosperm which supplies the proteid or muscle-building portion of the food. The outermost layer of the endosperm consists of square cells, larger and more regular in form than those on each side. These contain small particles of gluten or nitrogenous matter.

The remaining central mass of the seed is composed of numerous cells containing many starch grains as well as gluten granules. This supplies the carbohydrates or fat-making element in the food. The outside layers above referred to become more or less dry and inseparable one from another, forming the substance known as "bran." At the lower end of the albumen and placed obliquely is the minute embryo-plant, which derives its nourishment in the first instance from the albumen. This is destined to form the future plant.

In measuring the long strides taken by the American people during the last three-quarters of a century, the culture of wheat and the manufacture of wheat foods must be reckoned as important factors. It is said that the average amount of wheat eaten by each person in the United States is about five bushels a year. It must not be imagined, however, that America is the only country that raises wheat. A well-known writer, who had some poetry in his soul as well as statistics, has called attention to the fact that "The sun never sets on the harvest fields of the world. The click of the reaper is heard around the world the year 'round. To follow the harvest 'round the world, begin in January in the Argentine and New Zealand; in February, go to East India, upper Egypt, and Chile; and stay there till the end of March; with April, drop down into lower Egypt, Asia Minor, and cross over to Mexico; May takes us to Algiers, Central Asia, China, Japan, and Texas; and in June the binder is at work not only in the fields of Turkey, Spain, and southern France, but in California, where big machines are pulled by twenty horses or gasolene tractors; and in Tennessee, Virginia, Kentucky, Kansas, Utah, and Missouri; hot July is the busy month in the north of France, Roumania, Austria-Hungary, southern Russia, and England, Germany, and Switzerland, and, returning to America, in Oregon, Nebraska, southern Minnesota, Wisconsin, Colorado, Washington, the group of Central States, New York, New England, and eastern Canada; August is a little more quiet, but still plenty to do in Holland, Belgium, Great Britain, Denmark, Poland, the Dakotas, and western Canada, aptly termed "the bread-basket of the world"; September brings harvest days to Scotland, Sweden, Norway, and northern Russia and Siberia, where some day enough wheat will be raised to feed the people of the earth; October continues the harvest scenes of these countries; November is divided between South Africa and Peru; December returns the traveler to his starting-place—back to Argentine—and thence to Uruguay and Australia for a prosperous holiday well earned."

That the whole-wheat grain contains all the fifteen chemical elements that are found in the human body, and in about the same proportion, is one of the interesting fascinating truths that have been developed by the study of dietetic science. That it contains just enough proteid, just enough carbohydrates, and just enough phosphates to nourish and keep in good repair the average human body is also affirmed by scientists and dietetic experts through all ages. Referring to the food value of wheat in a recent article on "The Joy of Eating," Dr. Woods Hutchinson wrote as follows:

"This great instinctive bread food of civilized man has now been shown to be practically the only grain or vegetable product which contains the life-giving protein or nitrogen stuff in sufficient amounts to supply a considerable share of the actual daily needs of the body in readily digestible form. All other grains that compete with it have some defect or disqualifying feature which throws them out of the race. Oatmeal, which comes closest to it in protein content, is not nearly so digestible, has less protein, and is so irritating to the average stomach that it should not be eaten to supply more than one-third of the necessary amount of bread in the diet. Rye comes next, but has scarcely half the amount of protein and smaller amounts of starch. It makes a sticky, gummy, indigestible bread, very apt to sour the stomach, which, weight for weight, has scarcely two-thirds the nutritive value of white bread. Rice, potatoes, cassava, and yams contain, of course, practically nothing but starch in varying proportions.

"The only other seeds which contain useful amounts of protein are the legumes—beans, peas, lentils, etc.—and all these, unfortunately, are cursed with irritating and strong-tasting flavoring extractives, which reduce their availability for the average stomach, especially in women and children; and, outside of lumber camps and armies, to about one or two full meals a week, as crystallized in the famous 'Saturday baked beans' of New England.

"A year or so ago an interesting series of experiments were made on the actual utilization by the body of different proteins, with the rather unexpected discovery that the protein of corn—called 'zein'—was only about one-third as capable of digestion and combustion in the stomach as the proteins of wheat (gluten and gliadin).

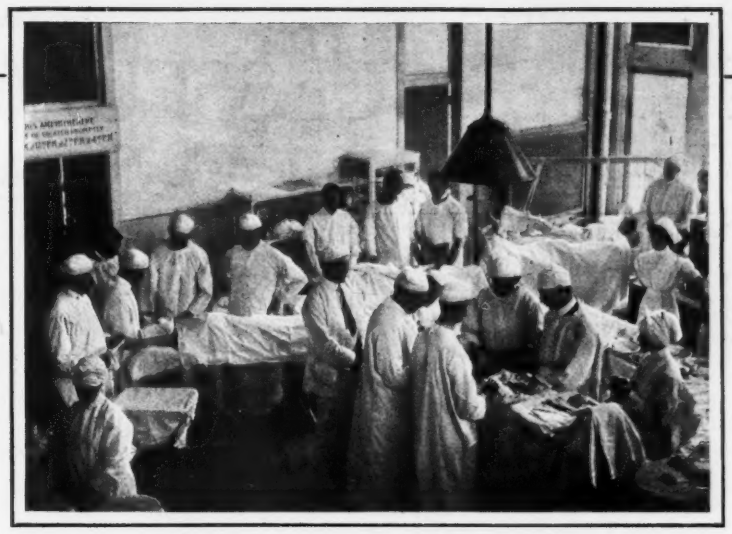
"The point simply is that wherever financial conditions permit of a choice there is no bread food which is for a moment to be compared with wheat, and no fat food to be mentioned in the same day of the week with butter, especially for children."

Recognizing the whole wheat grain as man's real staff of life for thousands of years and the one perfect food which nature has provided for him, we find this grain has been prepared in countless forms and varieties for human consumption, from the white flour of commerce to the whole-wheat foods which claim to supply in digestible form all the proteids, carbohydrates, and phosphates in the whole-wheat grain. There is much diversity of opinion as to the comparative nutritive values of all these various products of modern food manufactures. That the whole-wheat grain, when properly prepared for the stomach, is the complete food for the human body, however, is the affirmation of nearly all students of dietetic science.

TO MAKE DOCTORS BETTER

BY

WILLIAM INGLIS



Five clinics at one time in the New York Polyclinic

Wonderful Achievements of the New York Polyclinic Medical School and Hospital, Which Now Needs Aid

IF a young doctor could begin practice where an old doctor leaves off—that is, if he could possess in addition to his young strength and zeal and stamina the ripe experience and familiarity with disease and cure that the old doctor has slowly and laboriously accumulated, the young doctor thus reinforced would be the ideal physician or surgeon.

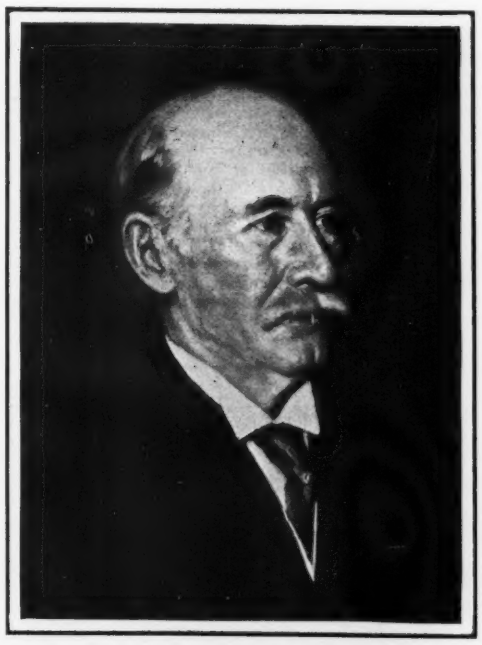
To supply this knowledge, to equip the young practitioner with the wisdom acquired by ages of struggle with evil conditions, is the chief ambition of the medical profession to-day; and perhaps nowhere else in this country are the means of imparting this wisdom together with practical experience so efficiently developed as in the New York Polyclinic Medical School and Hospital. In its spacious new building, twelve stories high, at Nos. 341 to 351 West Fiftieth Street, New York, the work of healing is being carried on in the most efficient manner known to medical and surgical science, while daily in the dispensary, the hospital ward, the operating-room, or the laboratory hundreds of young doctors are acquiring a wealth of instruction from the ablest practitioners and of actual contact with cases that sends them back to their neighborhood not only splendidly equipped, but the bearers of the torch of knowledge to others. The newest improvements, discoveries, and inventions in medical and surgical science are all taught here. It is impossible to exaggerate the beneficent influence exerted by such an institution as this not only upon the 100,000 patients there treated every year, but upon the welfare of the country at large. The methods used for their cure are disseminated throughout the length and breadth of the land. In the last thirty years more than 20,000 students have attended the clinics in this institution from the United States, Canada, Mexico, the South American states, the West Indies, Australia, China, and Japan. To go through the hospital from top to bottom, to see its various activities in full progress, to witness the zeal of the instructors and the enthusiasm of the younger doctors who learn from them, is to obtain a new vision of modern altruism and sacrifice that far outstrips in its intensity the narrow selfishness of which we hear so much and see so much nowadays in the world of business.

It is interesting to trace from its beginning the evolution of this institution, to discover, in the first place, that it had its origin in the unwillingness of its founder, a young doctor duly graduated and certified, to go out in the world and use suffering mankind as so much research material until experience at their expense should give him proficiency. He was—and is—Dr. John A. Wyeth, a lad who left school in 1861 and fought through the Civil War in Forrest's Confederate cavalry, and at the end of the war began to study medicine. I quote from the history as Dr. Wyeth related it in an address to the Association of American Medical Colleges on March 20, 1909, at the New York Academy of Medicine, of which he was President. He was graduated, in 1869, from the Medical Department of the University of Louisville, one of the oldest and deservedly best known of the medical colleges in the United States, and yet "the teaching of surgery and medicine was almost wholly didactic. When an operative clinic was given, the students witnessed it at such a distance from the subject and with so many interruptions of vision that it was impossible to follow closely the details of technique, without which the lesson of a demonstration is valueless. Not once in my two college years did I enter the ward of a hospital or receive instruction by the bedside of a patient. . . .

"In my native village of northern Alabama I put out my sign, but two months of hopeless struggle with a Presbyterian conscience convinced me that I was not fit to practise medicine, and that nothing was left for me but to go out into the world of business to earn money enough to finish my education. I felt the absolute need of clinical experience, and a conviction which then forced itself upon me—that no graduate in medicine is competent to practise until he has in addition to his theoretical a clinical and laboratory training—was the controlling idea in my mind when in later years the opportunity offered and it fell to my good fortune to establish in this city the New York Polyclinic Medical School and Hospital."

The institution was organized in 1881, and in 1882 opened its doors in East Thirty-fourth Street, where for years it ministered to the suffering of the poor and held its place as the pioneer post-graduate medical institution in the United States. At the basis of it were certain clearly defined principles: The preservation of human life against disease, the betterment and upbuilding of mankind, is the first duty of all. Ours is a new country. It is unique. No older civilization is like it. It is a frontier country, with millions of its people scattered in inaccessible regions, with physicians ill prepared to protect them as they should be protected. The founder of the school was graduated under the best conditions of his day, yet felt that his equipment was inefficient. It occurred to him that something must be done to elevate the standard of the medical profession, to stimulate graduates to endeavor to become scientific, practical, proficient doctors. There was nothing to do but organize an institution to afford actual practice for doctors already graduated—of whom, even to this day, only one-tenth obtain first practice as internes in hospitals.

"The result," says Dr. Wyeth, "has been a complete revolution. Looking back at the changes in the last thirty years, I can hardly believe it is the same profession. We had as many doctor-students as we could take care of in our first year, and we have had as many ever since. Post-graduate medical schools and hospitals have sprung up in all the chief cities of this country. In Chicago alone there are five. If one doctor in a town or village took a course in a post-graduate hospital he was sure to talk of it, and as a result the others had to go.



Dr. John A. Wyeth

FROM A PORTRAIT BY J. CAMPBELL PHILLIPS IN THE NEW YORK ACADEMY OF MEDICINE

"It took nearly twenty years for the medical organizations to recognize the change by official action. When I was made—to my great surprise—president of the American Medical Association in 1901, that association began to use its influence to better American medical schools. It organized a Committee on Medical Colleges and began to raise the standard of admission to practically a college degree; compelled every medical college to require a four-year course as a preliminary to graduation, and, in order so far as possible to eradicate commercialism from the medical profession, provided that all the medical schools of the country should become part of a central university system. For example, the four separate medical colleges which formerly existed in Louisville, Kentucky, are now consolidated in one school, which constitutes the Medical Department of the University of Louisville."

Even a layman could not fail to be impressed by the difference between the methods of instruction in the New York Polyclinic and those of the ordinary medical school. True, there were amphitheaters for lectures and certain clinics; but by far the greater part of the clinics were at the actual bedside of the patient, with sections of four or five doctors in close attendance upon the demonstrator, learning from him, in some cases helping him, but, best of all, acquiring from the experience of actually seeing and treating the cases that knowledge which no amount of distant lecturing in the amphitheater could give. The doctor-students at the Polyclinic saw at close range in the operating-room all the intricate details of surgical operations and dressings. Some of them, who had qualified after some months as internes in the institution, performed certain operations. In the laboratory with its courses in histology, pathology, bacteriology, clinical microscopy, and clinical chemistry every student enjoyed the advantage of working beside the head of that department. No one is accepted in this branch unless he shows special aptitude for the work and undertakes to go through the full course of study.

Thus far we have been considering conditions that are ideal. Let us now turn to the practical wants, or, rather, to the one great practical want of the institution—money. If the New York Polyclinic Medical School and Hospital had not done a splendid humanitarian work during thirty-one busy years and were not still doing it, its needs would not perhaps command a respectful hearing. But it does seem a reflection upon the intelligence no less than the philanthropy of America that this asylum for the distressed and fountain of the art of healing should remain as it is, cramped and unable to do its best work, by reason of lack of money. The hospital needs money to build an automobile ambulance station and six accident wards. They ought to be built, equipped, and in use at this moment. The ambulances it already owns cover a district inhabited by 360,000 people, and the hospital has treated as many as forty-five accident cases in one day. One-third of the cases now brought in are treated temporarily and of necessity transferred to Bellevue or the city hospitals because there is not room at the Polyclinic to take care of them. Those so badly injured that they cannot be shifted are kept at the Polyclinic. It is important that all the cases brought in should be kept in the institution not only for the best results to the injured, but for the sake of the experience afforded to the doctor-students, who in turn carry the light into their home neighborhoods.

The running expenses of the Polyclinic are about $250,000 a year. These are met by the fees paid by doctor-students and by the wealthier patients among the one hundred thousand who are treated each year. Thanks to the low cost of the ground on which the hospital is built and a low interest rate, the carrying charges are light as possible and no help is needed there. The only things lacking now are the six accident wards and the automobile ambulance garage. To provide these will cost one million dollars. That million ought to be forthcoming as soon as the moneyed men of America learn what a marvelously beneficent work can be accomplished with it.

DULUTH'S SUCCESSFUL STORY

A Mining Town that Made Itself an Agricultural Object-Lesson

A view of Duluth's harbor

BY HERBERT STOCKTON

THOUGH there was a trading-post at the head of Lake Superior a hundred years ago, and a French trading-post a hundred years before that, Duluth's history began when this territory was ceded by the Indians to the United States in 1855, began a second time when the railroad entered in 1870, was broken off in 1873, and took a fresh start in 1880, when the Northern Pacific got its new lease of life and the bonanza farmers invaded Dakota. As the wheat began to flow from the bread-basket of the world to the port at the head of Lake navigation, Duluth took a fresh grip on the skirts of destiny.

Next iron was discovered a hundred miles north of Duluth at Vermilion Lake, and Charlemagne Tower built a railroad into the wilderness to reach it. Next the Mesaba was discovered in 1890 by the Merritt brothers, who built a railroad to the new range, pawned it for funds to complete it, and went under in the hard times that followed 1893. The Mesaba Range turned out to be the biggest iron-mine in the country. Its shipments are sixty per cent. of all the iron mined in the United States, it supports a population of 75,000 in a series of thriving villages, and more earth and rock are blasted every year than at Panama. It has known deposits of a billion and a half tons, with new discoveries every month which will keep the furnaces going for the next hundred years at least.

Lumbering was the great business in the early days at Duluth, but that is declining in importance, and the annual cut of this district has dwindled to half a billion feet a year or less. In fact, the lumbering business has moved out of town to Cloquet, twenty-eight miles over the hill, and to Virginia, on the Mesaba Range, where there is a mill with a capacity of a million feet every twenty-four hours. But lumbering is not what it used to be, and the manufacture of hardwoods—there is any imaginable quantity of spruce and tamarack and birch and poplar—is gradually taking its place.

From lumbering several indigenous industries have arisen. The lumberman wears a boot with a rubber foot—making that is a Duluth industry. The lumberjack's mackinaw is the most comfortable winter garb ever devised. Duluth has refined it into a garment of fashion, the delight of the college boy and the joy of the "fan." Duluth has also become the headquarters for the manufacture of log-loading machinery for lumbermen all over the world.

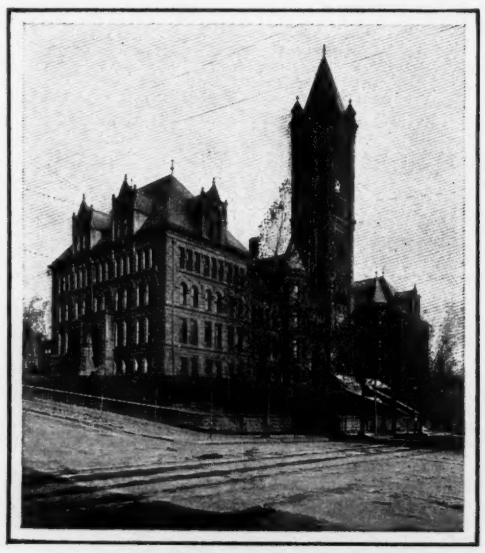
Duluth is a natural distributing-point, and its jobbing-houses, at first serving home territory only, have gradually enlarged their field until their trade extends all the way to the Southwest and the Pacific coast, and some of the most important concerns in the country are located here.

But Duluth's chief boast has to do with neither mines nor lumber nor jobbing nor transportation—its great achievement is agricultural development. Duluth was almost the only town in the United States that essayed to be a great city, yet was not founded in a farming community. Except the Range country, Duluth's base was three or four hundred miles away.

Every one knows to-day that the Lake Superior district is a great dairy country, that there is no sweet corn or peas to excel the product of Northern Wisconsin, no clover to equal in richness and nutrition that of northern Minnesota, and that a country that will give thirty tons of rutabagas to the acre is not to be despised agriculturally. But only a few years ago it was the impression that northern Wisconsin was all stumps and sand, and northern Minnesota was all rocks and stumps, and that both were agriculturally impossible. There were thousands of settlers, indeed, in the northern country, but few of them were doing much to dispel the unfortunate impression of this region. Most of them were "shotgun" farmers, who found it much easier to get a subsistence by hunting and fishing and working a little in the woods than to subdue their land.

The first step was to employ an agricultural expert who went about among the farmers, organizing clubs and co-operative associations, showing them what was good practice and pointing out where they were failing to get the best results, stimulating interest among those who were discouraged, finding the way to market for those who were remote, inspiring new ambition in those who had no hope of this country. That is all familiar now and the original missionary's place has been supplied by an agent maintained by the Federal government and the state in co-operation with the Commercial Club, and when the National Crop Improvement Association offered to help in good works of this sort its first check for a thousand dollars was sent to the Duluth Commercial Club in recognition of its primacy. Duluth and St. Louis County have taken first prizes at the state fair for clover and alfalfa, for potatoes, for celery and head lettuce, and for market-garden display, till it is almost a habit. In competition with the United States and Canada, Duluth showed the best bushel of potatoes at Madison Square Garden in 1911, and again in the competition of the Northwestern states at St. Paul in 1912.

In line with the same purpose, the one thing Duluth has asked of the state is a demonstration farm school, to be an arm of the Agricultural College, and to have such simple equipment that the boys and girls who come from the farm shall live as nearly as may be in farm surroundings and go back to the farm without getting out of their environment. An appropriation was obtained for land and initial buildings, to be no more elaborate than an energetic farmer can provide for himself, and a graduate farmer has been engaged to teach agriculture there with especial reference to the problems of the cut-over country. It is all a piece of the same development that Minnesota is preparing to spend $20,000,000 in the next ten years on roads, largely in northern Minnesota, which needs them most. St. Louis county alone spends $250,000 a year on roads.



The Central High School of Duluth

About the time when Duluth diagnosed its agricultural backwardness it came upon another symptom of arrested development. The city did not seem to be getting as much as it ought out of its situation at the head of Lake navigation. Ore, grain, and coal, the great bulk commodities, were moved by water under modern appliances—appliances so efficient that their enormous movement of 40,000,000 to 125,000,000 bushels of grain, 25,000,000 to 34,000,000 tons of ore, and 6,000,000 to 11,000,000 tons of coal per annum added little to the apparent traffic of the port. Loading a Lake vessel with 200,000 bushels of wheat takes only a few minutes and employs a handful of men. A 10,000-ton cargo of ore is likewise shipped by opening a chute and letting it run. And the enormous electric conveyers scoop out the contents of a cargo of coal with hardly a touch of hand labor. But while bulk cargoes were so simply handled, general commodities were not coming in anything the proportion one would expect. Investigation showed that the rates were those drawn up in older days to favor the city where the rate-making power had its seat, or to give the railroads the longest possible haul, or simply to oblige the shipper who brought the most pressure. The Commercial Club was invoked, a traffic expert was employed, and a thousand errors and oversights in the tariffs were corrected. For the railroads, like other beneficent providence, help those who help themselves. With their co-operation and the additions of rulings from the Interstate Commerce Commission, Duluth is establishing for itself the benefits of its position.

In recent years nearly all the railroad construction between the Rocky Mountains and the Mississippi has had Duluth for its base, and two important systems have wheeled through a right angle to make Duluth their principal terminal instead of an interior point.

In addition to its efforts to correct railroad rates, Duluth has begun a campaign for public terminals. Duluth was converted to municipal ownership ideas by a scourge of typhoid fever twenty years ago, because the company that owned the water plant was not able to provide a pure supply. The city acquired it after a struggle and made a notable success of its operation. The water has been above reproach, there has never been a serious epidemic since then, rates have been reduced, and the price of gas has been cut in two. The gas, by the way, is a by-product from the cooking ovens of an independent furnace which makes its fuel from the screenings of an enormous coal dock. As a consequence domestic gas is seventy-five cents a thousand to the Duluth consumer, and fuel gas is fifty cents a thousand.

Within ten miles of Duluth the St. Louis river has a fall of more than four hundred feet. This has been utilized to form a series of dams and canals, which give an effective head of 375 feet at the wheels three miles from the city limits—more than twice the head of Niagara. With that enormous energy, one quart of water per second delivers one horse-power at the center of the city. The power delivered in 1912 was equivalent to 400,000 tons of coal. The development furnishes 45,000 horse-power so far and has 200,000 in sight. Electric power runs the majority of the industrial plants, especially the smaller industries, the street-railway system of Duluth and Superior, and the electric lights of both cities.

In consequence of the improved situation as regards the cost of living, of the rapidly increasing settlement of the immediate country, of the corrections in railroad rates, and of the important influence on rates that the steel plant will exercise, Duluth is growing in manufactures as well as in wholesaling.

Building Men—Not Champions

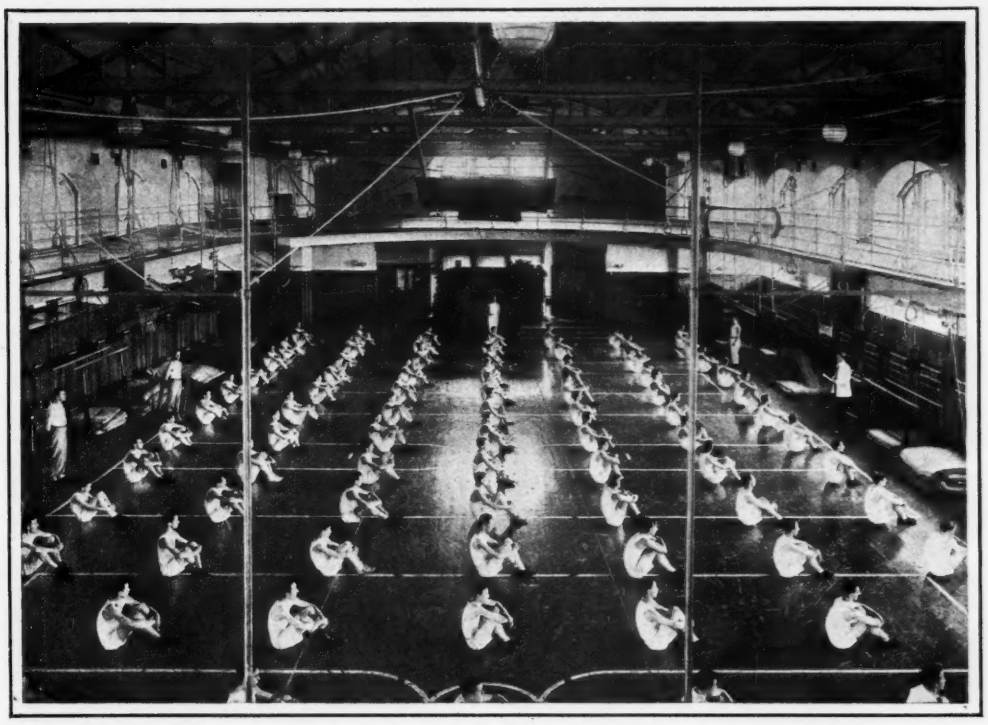
The Remarkable System at the College of the City of New York and Some of Its Excellent Results

BY WILLIAM HEMMINGWAY

Testing the sight of a big class

PHYSICAL America is beginning to shrink. That is to say, the amount of our natural resources is no longer keeping its level with the growth of population. The resources must be husbanded, the soil must be cultivated more intensively, and the gifts of nature no longer prodigally wasted. We have been hearing a great deal of late about movements for the conservation of forests, of coal-lands, of water-power, etc., but nowhere, so far as I have learned, of a systematic, sustained, all-embracing scheme for the conservation of human life and strength, which are, after all, the greatest asset of a people.

Such a job as this is a task to fire the ambition of any man. To see the scheme in operation is enough to revive the hope of any citizen who may for a moment have listened to howlers and begun to think that nowadays we are all going to the dogs. The tendency of great cities, of course, is to kill men, or at least to cruelly rob them of vitality, chiefly by crowding, dirt, and the lack of fresh air, sunshine, and exercise entailed by their cramped environment. So far as athletic championships and records afford evidence, we find that ever since games have been held and records kept many city athletes have been of the first quality; yet the average city man, the man in the street, has been terribly handicapped by abnormal living among masses. If the man in the street could be taught how to fortify himself, how to make the most of what is in him—though not to the extremes attained by the champion—he, too, can attain to the first rank in the perpetual struggle that is life. Indeed, he will feel better and live longer than most champions.



A "floor talk" on health by Dr. Storey

Quite by accident I happened the other day to discover a full-fledged, highly developed plant for the conservation of humanity. The scheme of its organization is so sane and its results thus far are so excellent that they are well worth pointing out. The plant is operated, logically enough, in the College of the City of New York, the intellectual division of that vast metropolitan melting-pot into which myriads of men and women of all the races of mankind are poured every year and from which they emerge full-fledged Americans. The director of it is Dr. Thomas A. Storey, A.M., M.D., Ph.D., a graduate of Stanford and Harvard universities; and a corps of sixteen experts assist him in the scheme of building up lifelong habits of health, strength, and efficiency among the 2,500 boys of the preparatory school and the 1,300 young men in the college proper. "If this department has been successful," says Dr. Storey, "it is the result of the loyal, efficient, uncomplaining service of the men on the staff."

The college has its regularly organized teams for track and field sports, basket-ball, baseball, tennis, swimming, water polo, and soccer football, just as all other educational institutions have—but the chief function of its athletic sports, as well as of all its forms of physical exercise, is to establish habits of clean living, health, and stamina on a permanent basis. No foul player is allowed to stay on any team. Instead of trying to develop, say, a world's-record sprinter who can do the hundred yards in nine and three-fifths seconds while three thousand of his fellows roar with delight, the aim is to develop the three thousand fellows so that they all can run decently, swim well, climb, jump, and handle weights with some skill, but, above all, have the habit of keeping themselves clean and in permanent good health, at the highest pitch of working power and moral responsibility. The trustees and President Finley have done much to dignify and assist the work of the department, which, by the way, is now organizing the Fourth International Congress on School Hygiene, to be held at Buffalo, New York, August 25th to 30th.

How are school-boys and collegians to be coaxed into healthy development, persuaded to follow a rational plan of living? There must be an ideal in the mind of the teacher, the one who takes the mass of plastic young human material and does his share of molding it into men. Dr. Storey, as long ago as 1908, defined his ideal in a paper before the International Congress on Tuberculosis at Washington, D. C. He said:

"The health and, therefore, the immunity of the whole body depends upon the health of all its constitutent parts—on the health of its cells. If the cells are all well nourished, active, and protected from extremes of pathogenic influences, their summated health will be the health of the individual whose body they in combination make. That such a healthy individual is possessed of a certain degree of immunity has been proved empirically and experimentally, and it is equally well established that the possession and conservation of the healthy body depend upon the observance of several simple hygienic procedures. These hygienic procedures are the same as those which I have already stated were essential to the body cells. Furthermore, these procedures must be the fundamental procedures in any wise and well-ordered policy of personal health control.

"The well-planned policy of personal health control teaches men to eat properly, to drink properly, to breathe properly, to take proper care of the excretions and wastes, to exercise wisely, to rest wisely, and to keep reasonably clean with reference to disease-breeding organisms. Such governing principles lead to and conserve human health. Failure to respect any one of these principles will jeopardize the success of the others. No rational scheme should rely upon exercise alone for health, nor upon any other one procedure or habit. One must respect all of these several requisites in order to work under a wise policy of personal health control. The man who regulates his habits of eating and takes no exercise cannot expect health. The man who exercises properly and eats wisely will fail to secure health if his habits of sleep are bad. On the other hand, a reasonable observance of these several simple hygienic laws cannot fail to secure and conserve health for the average individual.

"Such an individual will be possessed of millions of active, healthy cellular structures working for his protection, constructing for him a defensive armamentarium, and ready on demand to respond with supreme reaction against the invasion of disease."

How is the ideal realized? To begin with, every student at the College of the City of New York is carefully examined twice a year—or whenever else he may request—as to the condition of heart, lungs, and other organs, skin, eyes, teeth, etc.; and if any serious defect is found he is advised to see a doctor at once. He is required to take home a written notice to this effect and to bring back a reply from his parent or guardian. The report of cases of infectious diseases by the Health Department is checked up every day. If any student is found to live in an infected home, he is at once excluded from college until he can bring a certificate from the Health Department that he is free from taint. And, of course, if a student at any time shows symptoms of disorder he is at once examined. Whenever a student returns to college cured of typhoid, diphtheria, or similar disease, the germs of which he unconsciously might still be carrying, he is examined to make sure that there is no danger of infection from him. For the sake of accuracy and certainty in these and similar examinations, the college department of physical instruction and hygiene maintains an excellent laboratory, in a renovated room, by the way, that used to be a butler's pantry—quite a different means of conserving vitality. In this laboratory a daily test is made of the water in the college swimming-pool. All of the ordinary bacteriological tests and chemical analyses can be made. The aim is to have the laboratory afford perfect protection against disease-carriers.

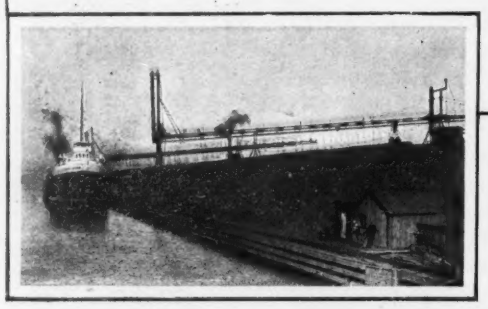
Every boy in the college is obliged to take enough exercise to keep him fit.

Carefully examined twice a year

THE QUEEN OF THE INLAND WATERWAYS

BY JULIUS H. BARNES

Chairman of the Duluth Traffic Commission



Unloading coal at Duluth

The entrance to Duluth Harbor

IN 1658, the year of Oliver Cromwell's death, the first venturesome explorers reached the far western end of Lake Superior in a birch canoe.

Where the City of Duluth now stands there was then, and for two centuries later, a dense pine forest reaching to the very waters of the lake. The light craft of the early explorers, ascending the small streams at the western end of Lake Superior, needed then but a short portage to reach the rivulets that flowed west into the Mississippi, and thus Duluth became the first trans-shipment point for the light supplies of explorers, missionaries, and fur-traders, nearly two and a half centuries ago.

For two centuries the craft on Lake Superior progressed only from the light birch canoe to the flat-bottom skiff of the trader, and then began an era of transportation development the like of which the world had never seen. As late as 1846 all the commerce of Lake Superior was transferred around the Falls of St. Mary's River between Lake Superior and Lake Huron, and one old gray horse and a cart were sufficient to portage all the commerce of Lake Superior.

Then followed the era of development which made the figures of transportation tonnage so tremendous that they mean nothing to us unless we have imagination to illumine the dry statistics of the government record of Sault Ste. Marie's Canal.

What does it mean to us to say that the tonnage through Sault Ste. Marie's Canal into and from Lake Superior for the season of 1912 equals eighty million tons? What does eighty million tons express to us until we begin to calculate how many old gray horses and carts would carry eighty million tons around those falls?

What does it mean to say that 243 million bushels of grain moved on that waterway during the season of navigation of 1912, and that the average rate of freight for carrying that grain from Duluth to Buffalo was 1½ cents per bushel? The rail freight for that trip would be ten times that much, even were it physically possible for the railroads to handle such a volume of grain at all, which they certainly could not do with their present facilities.

Or that fifteen million tons of coal moved westbound at an average rate of thirty-five cents per ton for that long water trip, where the rail freight would have been ten times as much?

The country at the western end of Lake Superior is just beginning to be settled. Just west of Duluth there is a territory as large as New England of fertile soil, which has needed draining, and is getting it; which has needed roads—and Minnesota is gridironing it with highways at the state expense.

It needs railways, and the railways are pushing their extensions into it. It has needed pioneers, and its proportion of settlers arriving is larger than in all the other Northwestern states combined.

The great railroad systems of the Northern Pacific, Great Northern, and the Soo are to-day delivering in Minnesota more carloads of immigrant goods than in all the states combined on their western systems of North and South Dakota, Montana, Idaho, Washington, and Oregon.

We have been accustomed to think of the far West as the land of opportunity, but northern Minnesota to-day is a more promising field for the agriculturist, and especially for the man with the patience and the courage to utilize the cut-over timber lands of that section, than any other area in the United States.

The Canadian government will develop its transportation route to enable wheat to be delivered in foreign markets so cheaply that it can compete with the wheat product of the cheaper labor of India, of the Argentine, of Australia and Russia and Manchuria. The Canadian government is far-seeing enough to see this and to plan for it. Within the space of a few years there will be a canal around Niagara Falls which will permit the larger boats to cross Lake Ontario and reach the head waters of the St. Lawrence. From there to Montreal is but a cheap water-shipment route of some 150 or 175 miles.

The effect of this will be that grain will be taken from the western end of Lake Superior and delivered at the port of Montreal at a freight charge of four to five cents per bushel. And with fair ocean rates from Montreal to foreign markets, and fair railroad rates from the western end of Lake Superior to the grain fields, the grain grower of Western Canada can once more stand a chance against his great cheap competitors.

And New York State, with its great barge canal from the Great Lakes to New York City, will be as cheap a route and as helpful in its saving of transportation costs as the St. Lawrence River itself.

Each year this western country is settled more and more densely. Its needs, its requirements, increase steadily. And all the thousand products that supply homes and shops and factories must use that water route also.

Duluth, the far western port of Lake Superior, forty years ago a pine forest, to-day a thriving city; yesterday an outpost of the pioneers, to-day ranking third or fourth in tonnage of all the great ports of the world. Back of it a territory yet unopened; east of it a water highway not yet fully developed to its full usefulness. To-morrow, what?

THE WORK OF THE GRAIN EXCHANGE

BY CHARLES F. MACDONALD

THE function performed by the grain exchange is not surpassed in its value to the people and contribution to the general welfare by any business agency of the day. The marketing of the crops of the country, which, in the chief grains, aggregated in the year 1912 more than five and a half billion of bushels, is a matter of vital concern.

It is universally conceded that the basis of our great wealth and the welfare and progress of all business is the agricultural prosperity of the nation, and it is a matter not merely of general concern, but also of demand, that the grower shall receive the highest possible remuneration for his produce, and that he shall be enabled to market it expeditiously and at a minimum of cost. The crops which are raised by the producers of this country within a period of four or five months must feed the people for twelve, and the accumulation of this great food supply, and its distribution from the localities where it is grown to those where it is desired for consumption presents a problem which it is the mission of the grain exchange to meet in the interest of the people. To provide a market for the grower by bringing together the representatives of both buyers and sellers, and in this way to distribute the products of the soil to the consumers, is the primary purpose for which grain exchanges exist, and their usefulness to the community must be measured by the faithfulness with which they administer that trust.

Economists and students of business life universally concede the importance of the functions of the grain exchange and recognize them as rendering a great service, but that a large number of the people do not regard them so highly and look upon them as merely agencies for speculation in food products is not to be denied. Congress and legislatures of states are threatening legislation that would radically change the methods under which grain is marketed, and which would require much readjustment, in the process of which the chief sufferer would unquestionably be the producer.

This feeling of antagonism grows very largely out of the trading in contracts for future delivery, and it is unquestionably true that it is not the legitimate use of this very valuable and necessary function in the marketing of grain that has provoked hostility, but the fact that it has been at times misused and abused. The exchanges themselves recognize this and are striving to eradicate abuse and manipulation by severely penalizing it. But it is known to every exchange that the volume of illegitimate dealing is infinitesimal in comparison with that of the legitimate hedging and speculative trading. The spectacular gambling and manipulation are always exploited sensationally, and the popular impression is derived in that way and the exchange suffers for the sins of the few. The efforts to stamp out the undesirable trade are happily bearing fruit, and there is much reason to believe that the day of wild gambling in grain has passed. It must always be borne in mind, however, that grain is a commodity that is sensitive to changing conditions and very responsive to the supply-and-demand situation, and years of short crops will always find wide and rapid fluctuations in prices.

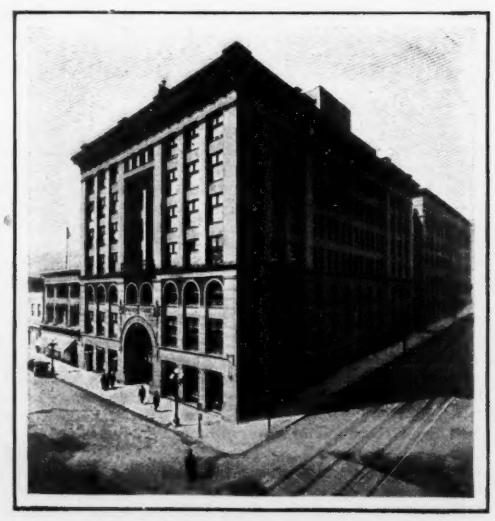
With the manner in which grain is actually marketed the public has little familiarity. In a general way it is known that there are commission men who solicit and receive the business of country shippers, elevators and mills which buy the grain, exporters who sell abroad, and that the grain is bought and sold through the medium of the exchanges; but of the magnitude of the trade there is little realization, nor is the value of the service rendered to the whole people appreciated.

From early in May, when Texas begins to harvest its crops, until late in August, when North Dakota and the other northern states have gathered in the last of their golden grain, the United States last year produced 730,000,000 bushels of wheat, 1,418,000,000 bushels of oats, 224,000,000 bushels of barley, 35,000,000 bushels of rye, and 28,000,000 bushels of flax, and in the fall the harvesting of corn added 3,125,000,000 bushels to this great volume of grain. It is true that only a portion of this reaches the primary markets in its original form, but the prices in those markets are the basis upon which the grain is marketed, wherever that may be.

With the first harvestings comes a flood of grain from the farmer, who must realize upon his labors of the year. All of this flows into the big markets and is distributed to the manufacturers and consumers with such ease and despatch and so little resistance as to cause little or no notice, and yet the market machinery and the handling facilities required to dispose of it are enormous.

Especially at the Lake ports has the handling of large quantities of grain been perfected to a very high point. One of the elevators at the head of Lake Superior in the fall of 1912 delivered 1,250,000 bushels of wheat into boats in ten hours' time. In the early seventies the Northern Pacific Railway's first car of grain into Duluth carried 13,000 pounds, but the great advance in railroad facilities has brought the average now to about 75,000 pounds. Figuring at that rate, it required 1,000 cars to transport the loadings of one day from this elevator—twenty train-loads of fifty cars each. The average production of wheat in the three spring-wheat states of the Northwest—Minnesota, North Dakota, and South Dakota, in 1912, was approximately sixteen bushels to the acre, so that the product of more than 78,000 acres of land was embraced in the million and a quarter bushels that went out of one elevator into boats in a single day.

The business transacted on the Duluth Board of Trade in the fall of 1912 affords an excellent illustration of the facility with which grain is marketed. In years of normal production, the Duluth Board ranks third in point of total receipts of grain among the grain markets of the country, and second in receipts of wheat. It is at the head of deep-water navigation on the Great Lakes, the farthest point inland that can be reached by the great water carriers that have steadily reduced the transportation cost of carrying grain until it can be fairly said to be at the minimum. At its very doors are the great fields of the spring-wheat territory of the country, the state of Minnesota, North Dakota, and South Dakota, with Montana now jumping rapidly into the front rank and promising to shortly become one of the greatest grain-raising states of the country.



The Duluth Board of Trade

Interludes

HOW TO MAKE JAIL LIFE ATTRACTIVE

(Now that so many estimable ladies are choosing to go to prison rather than abandon their principles on the subject of woman suffrage, we have retained the services of Professor Wilberforce Jenkins, the eminent gaologist, to prepare for their benefit the following hints on "How to be Happy in Jail." Professor Jenkins is a distinguished alumnus of many of our leading penitentiaries, having taken special courses in the most notable penal hostelries in Great Britain and America, and is the most eminent authority we have on the esthetics of cell life.)

1. Always greet your jailer with a smile. Nothing conduces more surely to human happiness than a habit of cheerfulness, which transforms tiers of cells into a beaming array of smiling faces.

2. If your cell is dull and dingy, at very slight cost the dreary iron bars of your cell door may be made most attractive by painting them with white-enamel paint similar to that used by amateur decorators of the home in turning a drab drawing-room into a white-and-gold parlor.

3. When time hangs heavy on your hands a pleasant way to spend an idle hour is to tear up the blankets and sheets upon your cot, and weave a rag carpet, or small rug, out of the strips, using the upright bars of your cell door as the framework for the intertwining strands.

4. A pleasant substitute for a five-o'clock tea can be had by a dozen lady prisoners occupying the same corridor, who arrange at a given signal to stand at the door of their cells and begin to talk all at once, continuing this for as long a time as there remains any illusion whatsoever in the proceeding.

5. A lively diversion for a rainy afternoon, and one likely to improve the aim of the lady prisoners, is what is called dinner-plate quoits. This consists in standing at the rear end of your cell and trying to hurl your dinner-plates through the openings between the bars of your cell door without nicking their edges. It requires considerable practice to become expert in this form of discus-throwing, but it serves to while away an idle hour most effectively.

6. If the prison rules are rather drastic in respect to your communicating by word of mouth with the lady in the cell opposite you, an excellent substitute for a carrier for the conveyance of a secret message is a fish-ball saved from your breakfast. This, if hollowed out and the inside filled with your written message, can be thrown across the corridor to your neighbor while the turnkey is not looking.

7. In the absence of facilities for knitting and embroidery a pleasant kind of spatter-work of a simple sort may be employed to lighten a dull afternoon, by asking for a bottle of ink and a fountain-pen filler. With the latter you can squirt the ink in all sorts of odd forms over the walls and furniture of your cell.

8. Even though you are a militant suffragette, do not permit prison life to destroy your dainty femininity. To this end take plenty of ribbon to jail with you, and tie bows on everything from the knob of your cell door to the jailer's ears, if you can get him to stand long enough to accomplish your decorative purpose.

UNAPPRECIATED

"See, John," said Mrs. Slathers, with a happy smile, "I have taught the canary every time I come near him to stick out his little bill to be kissed."

"Humph!" said Slathers, eyeing the bird critically. "Seems to me you spend your time teaching creatures how to present their bills for my attention—I got one from your milliner this morning, not to mention a dozen or two others in the same mail."

UNCHANGED

"That's just like Jim," said the widow, wearily, after a flapping curtain had knocked over the urn in which all that was mortal of her cremated husband had been placed and spread its contents on the floor. "Always dropping his ashes everywhere!"

AN ABSOLUTE CERTAINTY

THE RETORT COURTEOUS

"My son Willie tells me that you threatened to box his ears yesterday, Miss Tooter," said the irate parent, calling upon the school mistress, "and I have come in to say to you that if you ever—"

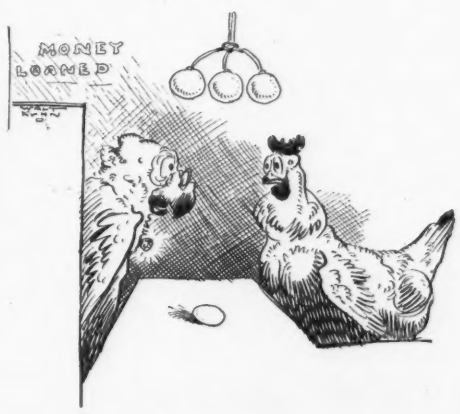
"Don't worry, Mr. Marrowfat," said Miss Tooter, graciously, "I'm not at all likely to do it. The janitor has been through all the department stores in town, and he can't find a box big enough for the purpose."

EVERY DOG HAS HIS DAY

THE TROUBLE

"I tell you, old man, there's always room at the top," said Jimpsonberry.

"I haven't a doubt of it," said Languish. "But the worst of it is there's never any elevator to take you up."



HARD TIMES

SOL PARROT *(the pawnbroker)*: Are you sure, madam, that you came by this egg honestly?

E—S—Q

"Pa," said little Willie, "what does es-kew mean?"

"Askew?" repeated the old gentleman. "Why askew means gone wrong, crooked. Why do you ask?"

"Why, I notice that after your name on all your letters they put E—S—Q, but I didn't know you'd ever gone wrong or was crooked, pa. What did you do?" asked little Willie.

FOUND!

"Do you think you can support my daughter in the style to which she is accustomed?" asked the cautious father.

"I know I can," said Sapleigh.

"Thank Heaven I've found you!" cried the cautious father, embracing him. "You can do more than I can!"

A PERTINENT QUERY

The drummer had been bragging about his achievements for a goodly time, and finally the meek little man in the corner piped up.

"Excuse me," he said, "but perhaps you can tell me why you gentlemen are called drummers."

"Well, why shouldn't we be so called? We drum up trade, don't we?" was the retort.

"I know," said the meek little man, "but the drum is not a wind instrument."

A REVENGEFUL SHADE

"The spirit of your deceased husband, madam, wishes to communicate with you on the subject of your remarriage," said the medium.

"Very well," said the lady. "Let him proceed. What is it he wishes to say?"

"He says," murmured the medium, going into a trance—"he says he is very glad you are going to marry Mr. Skeezicks. He always hated him."

EFFECTING A CURE

"I tell you, Blithers, this habit of yours of borrowing all the time is growing on you," said Jimpson. "You ought to do something to check it."

"All right, Jimp," said Blithers. "Just let me have the check and I'll do my best."

MOTHER GOOSE: SUFFRAGETTE

LULLABY

Rock-a-by, Baby in the tree-top,
Mother and Sister have gone out to shop.
Dad's on the Golf Links, but never you squirm:
Maybe some Birdy will bring you a worm.

LITTLE SALLY

Little Sally, blithe and gay,
Only four years old to-day,
Chucked a brick across the street
Through a window clean and neat—
Now her Daddy wants to bet
She'll grow up a suffragette!

TOMMY'S IN THE PANTRY

Tommy's in the pantry, eating up the jam.
Bobby's in the kitchen, giving cook a slam.
Betty's in the parlor, learning how to dance
Turkey-trot and Tango as they do in France.
Mamma's in the City, languishing in jail.
Papa's working day and night to get her out on bail!

MARY, MARY, QUITE CONTRARY

"Mary, Mary, quite contrary, how does your garden grow?"

"Really, sir," said Mary, "I truly do not know.
I've been busy latterly—a-marching far and wide
With all my sister suffragettes and let the garden slide."

A. Sufferan Mann.

CUSTOMER: Show me the thinnest thing you've got in summer underwear.
SALESLADY: Mary Jones, over there.

THE NEW LAKE SUPERIOR CLOVERLAND

BY FRANK N. HARDING

WITHIN a night's ride of Detroit, Chicago, and Milwaukee, about half a day's ride from St. Paul and Minneapolis, and at the very back door of Duluth and Superior, lies the Lake Superior dairy region of Wisconsin and Michigan, which has recently adopted, and with every show of right, the name "Cloverland." This vast expanse of rapidly developing agricultural territory, consisting of fifteen millions of acres of land, still partly forested, has, during the past two years, made wonderful strides toward the development of its agricultural resources. But a short time ago this territory was covered with splendid forests of timber, and the popular impression, encouraged by lumbermen, the natural foes of the settler, was that the region was unfavorable to agriculture because of its geographical position. With the passing of the lumberman came the advent of the settler, and immediately the wonderful agricultural, fruit, and dairy capabilities of this territory became firmly established.

Strangely enough, the significant position of this favored country was overlooked by agriculturists in the rush for Western lands, and here, within easy striking distance of such market centers as Detroit, Chicago, and the Twin Cities, is a vast, undeveloped, agricultural empire, located between the huge fresh-water lakes, Superior and Michigan, which temper and govern the prevalent frost conditions to an average summer crop-growing season of 140 days' duration, which compares favorably with the crop-growing season of the northern half of Iowa, southern Minnesota, and Nebraska. The climate is ideal for the farmer, the fruit-grower, and the dairyman. The summer days are perfect, with uniform precipitation continuing throughout the crop-growing season, and the summer nights are cool and comfortable.

The soil of this region is deep and rich, as is evidenced by the tremendous forests of pine and mixed hard woods which formerly covered the country. It is axiomatic that crops grown as far north as they can be matured show the highest qualities and most ideal development. All the crops produced in the temperate regions of the United States are successfully grown in this Lake Superior Cloverland. All grains and forage crops thrive wonderfully. As this region in the winter is covered with a blanket of snow, ranging from three feet upward in depth, the ground never freezes, and therefore clovers and fall-sown crops are never winter-killed.

The importance of this peculiar climatic condition cannot be over-estimated, and its significance to all who are engaged in animal husbandry is most marked. All grains, whether fall sown or spring, yield abundantly. Spring rye yields about 25 to 30 bushels, and spring wheat from 25 to 50, per acre. Oats, on these wonderful clay soils, yield unusual crops, running from 40 to as high as 108 bushels of officially weighed grain. Corn, of the earlier varieties, matures, and corn for silage and sorghum gives tremendously heavy yields. Buckwheat yields from 28 to 40 bushels per acre. Barley is a good crop and runs from 25 to 50 bushels per acre. Hay, clover, timothy, and millet are wonderfully luxuriant. Root crops, such as turnips, parsnips, rutabagas, and potatoes produce astonishing yields. Cloverland knows no rival in the growth of potatoes save the Aroostook region in Maine, or the Western irrigated lands. Yields will run from 200 bushels per acre up to 600 bushels, and that of potatoes of the finest quality.

The rapid development of the pea-growing industry in this northland is most worthy of notice. Peas present the peculiar merit of being both profitable for their own crop and beneficial to these newly-cleared lands upon which they are raised. These rich soils of the north produce such wonderful crops of peas that occasionally complaint is heard that some of the smaller-grained varieties grow larger peas than the fancy market demands. Pea straw is so plentiful in some districts that it is used for bedding. For canning purposes these northern-grown peas are as much better than those grown further south as they are for seed purposes. The development is more even and gradual and the ripening more graduated and perfect. This northern-grown pea seed is particularly sought after, upward of seventy-five per cent. of the seed peas used in the Middle West being raised here.

There is but one sugar-beet factory in this north country; it is located in Menominee County and is one of the best assets of the surrounding territory. Farm patrons find the beet-growing industry one of great profit, even greater than the same industry further south, as the local conditions which cause the beets to grow larger and yield a higher percentage of sugar content are those peculiar to this north country. The further north you go from the equator the more daylight there is in the summer-time, and the resulting excess of sunlight exercises a beneficent influence upon all growing crops, and notably upon the percentage of sugar in beets grown here, the agricultural bulletins showing that sugar beets contain from one to two per cent. more sugar than those grown in southern latitudes.

Small fruits, such as raspberries, gooseberries, currants, and strawberries, are most prolific, and of as fine quality as can be secured anywhere in the country. Onions, of a quality equal to the finest Bermudas are grown here. Cabbage, many heads of which refuse to go unstripped into a common salt barrel, and of a solidity and quality which bespeak freedom from attack by worms or pests, thrive upon the dark brown loams of the river bottoms, and find prompt markets with city jobbers. Celery and lettuce, of a crisp whiteness, and flavor so unsurpassed as to have created a demand for them in Chicago and New York markets, are raised in profitable abundance on the rich black-muck soils of this newly discovered farming country.

Lake Superior apples from the Bayfield and Keweenaw peninsulas, as well as from central portions of this region, have been prize-winners at state fairs and general land shows. Plums, cherries, and crab-apples are remarkably prolific.

Many advantages are offered to farmers in this region, among which are the finest and the most perfect educational system that can be found anywhere in the United States, from the graded schools, high schools, teachers' training schools, normal schools, agricultural experiment stations, mining school, etc., leading to the state agricultural colleges and universities. Churches of all denominations and rural schools are rapidly being erected in many communities of new settlers. People of all creeds find here comfortable homes. The rural telephone system is rapidly developing, and rural free mail delivery is being pushed even into remote districts. Railroad service, east, west, and south, is most satisfactory. Small towns and villages are springing up at country cross-roads, and in fact the whole region is rapidly changing from its original condition to that of a settled farming country.

Sheep-growing, stock-raising, the feeding of hogs and dairying, follow very naturally in the wake of the clearing of the land. This northern region is most admirably adapted to animal husbandry in all of its varieties. With its great fertility of soil, the bracing, invigorating power of its summer air and its freedom from insect pests, the country is specially fitted for the development of the dairy industry. Here cattle thrive on pastures which go under the snow green and come out green from beneath the melting snows in the spring. Here clover is never winter-killed. Acre for acre, lands in this Lake Superior region will produce more food for cattle than in the corn belts of Illinois and Iowa. Pure water, ample pasture, abundant production of beets, rutabagas, etc., never-failing clover crops, corn silage, oats, peas, and, in short, all the foods that go to make the dairy ration, point out this as the logical seat of the dairy farms for the Middle West.

In short, this district is just beginning to catch step with the general march of progress, and in the near future, in the hands of the progressive, up-to-date farmers who are rapidly getting into this territory, will take its place as the truck farm and dairy region for the immense markets of the Middle West.

Loading by the aid of horses

Modern Logging

BY

IRVING SMALL

Loading by the aid of a steam loader

THE enormous annual increase in demand for timber products has, during the past ten years, strongly encouraged the invention and manufacture of machines to expedite lumbering processes from woods to mill.

Where the logs were formerly "snaked" great distances through the woods behind a team of oxen, huge self-propelling steam skidders now run out on the ubiquitous logging railroad, effecting the same end at a hundred times the speed and at a very considerable saving in cost.

Where the logs were formerly loaded with the aid of horses, mules, or oxen, or even by canthooks alone, the steam log-loader now reaches down to the log piles left beside the logging railroad by the skidder and nonchalantly swings up its two or three hundred log feet a minute throughout a ten hour day.

The steam log-loader was the first machine to come into general use after the introduction of the logging railroad.

So far as the actual loading of logs is concerned, a comparatively simple derrick operated by a good hoisting engine will do the work satisfactorily.

The problem confronting designers and builders of log-loaders was to make a sufficiently strong and heavy combination of the two in such form that it could be quickly and easily moved and which could be brought into position to load a train of empties operating on a single track.

The weight of such a machine necessitated its transportation over the railroad. Economy forbade the use of double tracks or frequent spurs. Yet, to do its work, the machine had to be brought within loading distance of every car in the train. Thus it was necessary that the machine should operate on a single track along which a train of empties was passing in the opposite direction at the same time.

This problem has been solved in three ways:

First, by mounting the machine on the train and dragging it back over the cars as the loading proceeds.

Second, by mounting the machine on trucks adapted to run on the main track, sufficient space being left between the lower girders above these trucks and the deck girders supporting the loading mechanism to permit of the empty cars passing up inclined rail sections through the machine between the upper and lower decks, and down to the track again on the other side on other inclined rail sections.

The third and most generally adopted method was to provide the machine with legs, or standards, the ends of which rested on the ties outside of the rails, while the trucks and propelling chains could be swung up to a vertical position out of the way of the empties, which passed under the machine on the main track.

By equipping this machine with a "spotting" cable which can be carried back to the rear of the train of empties, car after car can be drawn by its own power under the machine into loading position beneath the boom. After the train has been loaded, the machine stands at the rear and the swinging trucks are then lowered to the rails again, when it may either push the loaded train out to the main spur, or proceed to the next loading-point, leaving this work to a switch-engine.

The logs are loaded either by means of skidding tongs, which resemble gigantic ice-tongs and are built on much the same principle, or with a crotch-line terminating in two end-hooks, one of which is fixed into each end of the log.

Steam skidders may be described as donkey-engines placed on flat-cars, having immense booms extending from the end of the flat-car into the air to an elevation of thirty-five feet above the rails.

Through blocks on the tips of these booms, the skidding, outhaul, and guying lines are run, while the decking lines are run through blocks suspended at a distance from the top of the boom equal to one-third of its length.

The crew required for a modern four-line steam skidder, skidding from two ends simultaneously, consists of two engineers, one fireman, two signal men, four hook-tenders, and four whip-tenders.

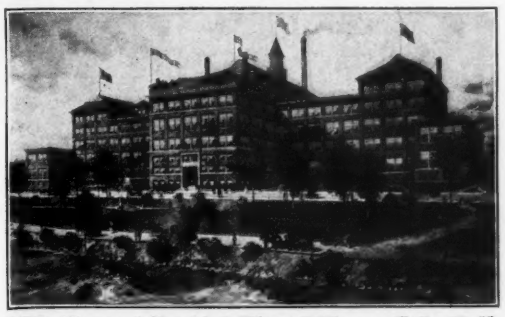
The machines are self-propelling. Their capacity will actually average, in the long-leaf pineries of the South, 125,000 feet per day for four-line skidders, and 60,000 feet per day for two-line skidders.

Steam logging-machines, of the types described and illustrated, have already been adopted by nearly all lumber concerns of any size, many of them owning scores of such machines. Without them it has become practically impossible to compete in the lumber business on any scale.

A FOOD FACTORY

ONE might as well visit Cologne without seeing the great Cathedral that has made the town famous as to visit Niagara Falls without seeing the factory in which Shredded Wheat is made.

The great Cathedral is all there is to Cologne. When you think of Cologne you think of the wonderful triumph of architectural genius that towers high above the ancient city. Of course there is something else in the city of Niagara Falls beside the Home of Shredded



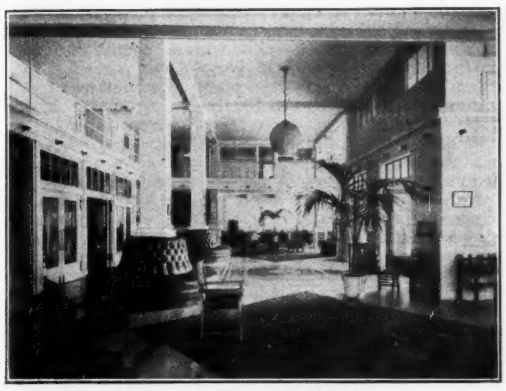
"The Home of Shredded Wheat," Niagara Falls, N. Y.

Wheat, but most travelers think of the famous breakfast food when the name of the town is mentioned.

This unique industry—the Shredded Wheat factory—is dedicated to the proposition—now accepted by the leading physicians and dietetic authorities and affirmed by the experiences of four thousand years—that the whole-wheat grain contains all the elements for the perfect nutrition of man. It is also dedicated to certain twentieth-century ideals of cleanliness and humanitarian treatment of employees.

It was a happy dispensation of fate that a portion of the power generated at the Falls should be dedicated to the health and happiness of the human family through the manufacture of the most perfect food that was ever devised for the nourishment of man.

A few years ago the residents of the prettiest avenue in the city of Niagara Falls woke up one fine morning to find that a tract of ten acres on this avenue had been cleared of its dozen or more dwellings and that ground was being broken for the building of a great factory for the manufacture of Shredded Wheat products.

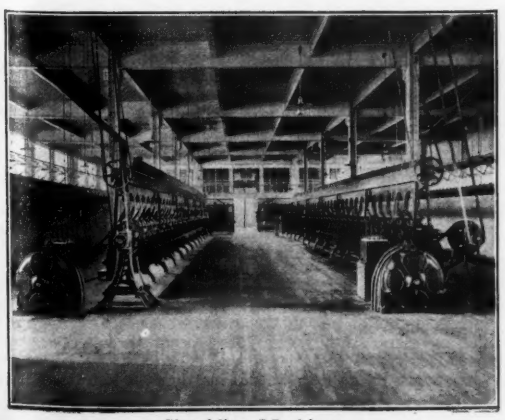


Reception Room for Visitors

Here was a building whose builders had the daring to invade the choicest residence neighborhood in the town to plant an industry far away from the smoke and dust of factory and railroad. This search for cleanliness and beauty, foolish as it might seem to the hard-headed man of finance, naturally constitutes one of the attractive features of the plant and gives it a unique place among the food-manufacturing concerns of the world.

The spectacle of a hundred thousand persons passing through a factory every year "to see the wheels go 'round" is something so unusual in this country as to call for more than passing notice. This is the number that annually passes through the Home of Shredded Wheat. The question naturally arises, "what is there so unusual about this factory that it should attract such crowds, even drawing them away from the scenic splendors of the Cataract itself?" Surely the ordinary factory is not such an object of popular interest—indeed, the average factory does not throw open its doors to the public.

Right here is the secret of the drawing power of this wonderful establishment. There are factories and factories. But the Shredded Wheat factory is unique. There is nothing like it in this or any other country. It is the dream of a "dreamer" fully carried out. This "dreamer," who invented Shredded Wheat Biscuit, said he would build the cleanest, finest, most hygienic factory in the world in which to make the cleanest and purest cereal food in the world, and he succeeded in making good his promise.



Shredding Machines

This is what draws the pilgrims from all lands. The building is located on Buffalo Avenue, in the heart of the best residence district of Niagara Falls, far away from the smoke and dirt of factories and railroads. Thirty thousand panes of glass let in the sunlight which floods every nook and corner with its cleansing rays.

The building is entered through a reception-room, on either side of which are writing and reading rooms for guests, furnished with beautiful rugs and sumptuous weathered-oak, leather-upholstered furniture. From the middle of the ceiling hangs a pendant, a great crystal ball, inside of which are brilliant electric lights. At the base of the vast columns supporting the ceilings are upholstered settees. Here may be found guides ready to pilot visitors through the building. The gallery around the reception-room, as well as the entire floor above, are taken up with the administration, publicity, and accounting offices of the Company.

To get an adequate and comprehensive idea of the process of manufacturing this famous cereal food it is best to follow the grains of wheat, from the point where they enter the building, through the various details of manufacture, to the finished product. The visitor therefore takes one of the electric elevators which runs to the top floor of the central tower, to which point the wheat is elevated and where it passes through twenty-two cleaning-machines which remove all dust, dirt, wild oats, mustard seed, cockle, straw, and other foreign substances, as well as broken and defective grains of wheat. Each one of these machines is a marvel of ingenuity and has some particular work to do. On this same floor is the cooking-room, equipped with great steel cylinders which are filled with the wheat from the cleaning-room. The wheat, while being agitated by revolving steel paddles, is cooked for about thirty-five minutes; a process that breaks up the starch granules in the center of the wheat kernel, rendering them soluble and digestible. The outer coat of the wheat berry is unbroken, and none of the nutritive elements in the wheat are lost in the process of cooking.

When the wheat is thoroughly cooked the steam is turned off, the end of the cylinder opened, and the delicious-looking grains of cooked wheat roll out into a hopper and drop down to the floor below into a drying, or "conditioning," machine, which removes the excess of moisture which remains after the cooking process and which must be eliminated before the wheat is ready for the shredding-machines. When a sufficient amount of the moisture is removed the swollen, softened kernels are ready for shredding and are dropped down through a hopper to a lower floor of the building, where they enter the shredding-machines.

On this floor is the Observatory, on the roof of the administration section of the building, which commands a wonderful view of Niagara River, the Rapids, Goat Island, Three Sister Islands, and other scenic beauties of this picturesque region.

On the lower floor are the shredding-machines, the great ovens, and packing-tables. Here the cooked wheat is fed into the hoppers of the great shredding-machines, each eighty-eight feet long and consisting of thirty-six pairs of shredders which draw the kernels out into fine, porous shreds, which are dropped upon an endless chain, laying layer upon layer, until the thickness of the Biscuit is formed, when the long band of white filaments is brought to a cutting device which separates them into oblong cakes and drops them into a pan holding fifty-two Biscuits.

The pan of Biscuits is then placed in the arms of a large drum, shaped like a Ferris wheel, which revolves in an immense oven until the Biscuits are baked, and then conveyed in large pan-racks to the packing-tables, where they are placed in cartons, and they in turn are placed on an endless belt which carries them to the sealing-machines on a floor above.

Packing Tables, showing Electric Fans

These sealing-machines automatically open the flaps of the cartons, cover them with dextrine—a vegetable glue—fold them together again, and then paste a strip of paper over each side in such a way as to join the edges of the flaps, making a package that is practically moisture-proof and air-tight. These packages are then carried along by means of belts between cylinders of steam and when they reach the end they are dry enough for packing in the wooden cases. These cases are made of spruce wood and are nailed together by nailing-machines which fasten down the lid at one stroke.

On this floor is the spacious, beautifully lighted dining-room where the company serves to its employees at noon-time a delicious, wholesome meal. At this meal the girls are guests of The Shredded Wheat Company. A separate dining-room is provided for the men and a nominal charge is made for the meals. After lunch the girls who choose to do so may lounge or visit in the comfortable restroom on this same floor. At one end of the restroom is a room provided with hospital bed and an emergency chest.

On a lower floor are the great Triscuit ovens in which are baked the Company's other product known as "Triscuit," the Shredded Wheat Wafer. Triscuit is made the same as the Biscuit except that it is compressed into a wafer and baked by electricity in a specially devised machine so interesting and wonderful in all its operations that it has attracted the attention of electricians from all over the world.

The Company has provided beautiful lavatories for the use of employees, at a cost of one hundred thousand dollars, which include shower, needle, and tub baths,

Dining Room for Employees

individual lockers, and other facilities for encouraging cleanliness and neatness on the part of employees.

It would require several pages of the WEEKLY to describe all the departments of this welfare work for which this institution is famous throughout the land.

While every piece of machinery and every danger spot is well protected, accidents are bound to happen, and in order to render prompt relief to the sick and injured the Company maintains a Red Cross Emergency Corps.

The food that is purchased and served to the employees in the two dining-rooms is carefully examined, the milk is tested daily, the dishes are all sterilized, and the use of cold-storage food is prohibited.

For amusement the management provides a skating-rink, tennis-court, bowling-court, baseball club, dances and receptions. The Company gives an annual outing to its employees one day each summer, and every Saturday afternoon is granted as a half holiday with full pay, not only to the office employees, but to all employees of the Company.

There are numerous other features for the mental betterment of the Shredded Wheat family which might truly be called educational. There is a choral society the meetings of which are held weekly, with a two-hour rehearsal during the cool season. A dancing-class is in operation through six months of the year and all employees of both sexes are eligible to membership. Deportment and etiquette form part of the instruction. A shorthand and typewriting class is conducted for the benefit of all employees. A musical association provides a fine brass band and orchestra.

Mere figures give a very inadequate idea of the noble proportions of this building. Those who like figures, however, will be interested in knowing that the Shredded Wheat plant is 463 feet in length by 66 feet in depth, contains 3,000 tons of steel and 200 tons of marble. Its beauty is greatly enhanced by the 844 windows with their 30,000 lights of glass, making it indeed a veritable "crystal palace."

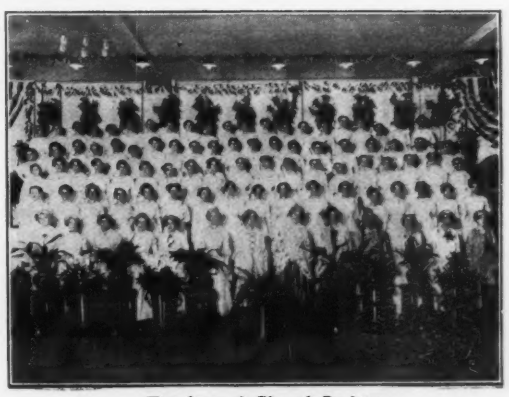
Nature has given us in the whole-wheat grain a perfectly balanced food. We believe that the shredding process (owned and patented by THE SHREDDED WHEAT COMPANY) is the most perfect and most scientific process ever devised for preparing the whole wheat in a digestible form.

There is no "substitute" for Shredded Wheat Biscuit. The "little loaves" are of such a size and form as to make them adaptable to all sorts of combinations with fresh or preserved fruits or creamed meats or creamed vegetables. In the case of fruits the porous shreds readily absorb and neutralize the fruit acids.

In the strawberry season many thousands of persons who cannot eat this luscious berry fresh from the vines are enabled to fully enjoy them in combination with Shredded Wheat Biscuit and cream. The same is true of other acid fruits. Its uses are by no means confined to acid fruits, however, as the Biscuits are equally nutritious and delicious in combination with sliced bananas and other non-acid fruits. The Biscuit form in which Shredded Wheat is made not only enables the housewife to give great variety to the daily dietary of the average home by making many delicious combinations with fruit, creamed meats, or creamed vegetables, but also permits of a great variety of breakfast dishes.

Triscuit, the Shredded Wheat Wafer, takes the place of the white-flour cracker, and as a toast is used as a substitute for white-flour bread with butter, cheese, or marmalades.

The officers of the Shredded Wheat Company are: Alexander J. Porter, President; George A. Mitchell, Vice-President; Fred Mason, Vice-President and General Manager; Frank L. Monin, Secretary-Treasurer. The directors are: William Hamlin, Joseph Henderson, Ogden L. Mills, George A. Mitchell, Alexander J. Porter, Robert W. Pomeroy, de Lancey Rankine, Ogden M. Reid, Carlton M. Smith. ***



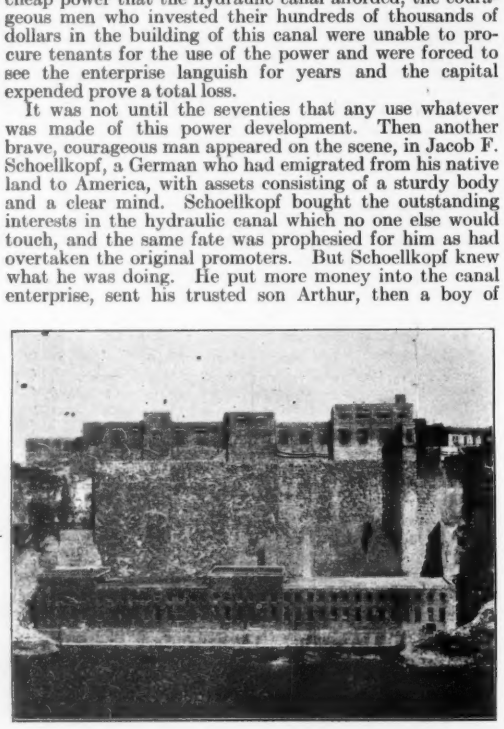
Employees' Choral Society

NIAGARA'S OLDEST POWER PLANT

THE hard-headed and practical New-Englanders who made the first white settlement near the Falls of Niagara at the beginning of the nineteenth century quickly realized that the Falls of Niagara had other than an æsthetic side, and that in the fall of the great volume of water passing through the Niagara River there existed tremendous possibilities. So imbued were they with this idea that the first name of the settlement near the Falls of Niagara was "Manchester," given in anticipation that the site should eventually be to America what Manchester in England was to that country—the chief seat of manufacturing enterprise.

It is only recently that the public generally has been interested in the power development of Niagara Falls, but the first step for the practical use of the energy available by the fall of water between the upper and lower level of Niagara River was taken by the organization of the Niagara Falls Hydraulic Company on the 22d day of March, 1853, and on the 20th day of April of the same year the work of building an hydraulic canal from a point above the Falls through a strip of land one hundred feet wide to a point below the Falls was begun, and the canal was shortly thereafter completed. Notwithstanding the enthusiasm of the promoters of that enterprise and the undoubted opportunities for manufacturing by means of cheap power that the hydraulic canal afforded, the courageous men who invested their hundreds of thousands of dollars in the building of this canal were unable to procure tenants for the use of the power and were forced to see the enterprise languish for years and the capital expended prove a total loss.

It was not until the seventies that any use whatever was made of this power development. Then another brave, courageous man appeared on the scene, in Jacob F. Schoellkopf, a German who had emigrated from his native land to America, with assets consisting of a sturdy body and a clear mind. Schoellkopf bought the outstanding interests in the hydraulic canal which no one else would touch, and the same fate was prophesied for him as had overtaken the original promoters. But Schoellkopf knew what he was doing. He put more money into the canal enterprise, sent his trusted son Arthur, then a boy of



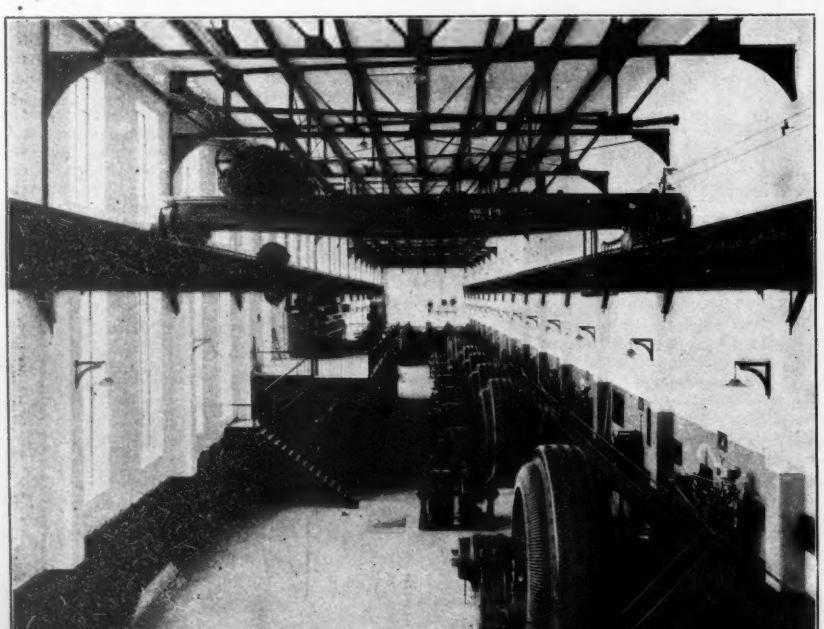
twenty-one, to Niagara Falls to look over the property, and built upon the canal basin a flouring-mill. The mill was successful and was followed by another flouring-mill, and then by dint of inducements in the way of favorable power contracts, silver-plating works and paper-mills were located on the canal basin.

The successful and practical use of the hydraulic power thus developed was the foundation of the present Hydraulic Power Company of Niagara Falls, with which Company and its predecessors the name of Schoellkopf has been indissolubly linked. Steadily but conservatively the power development of this Company progressed, and after the questions raised by the state of New York respecting the legal right of the Company to divert water were settled by the enactment in 1896 of a law by the legislature of the state of New York, confirming the riparian rights of the Company, but limiting them to the diversion of an amount of water that could be drawn through its canal 100 feet wide, with a maximum depth of 14 feet of water, the Company entered upon a rapidly increasing period of development. It obtained new customers, many of whom utilized the energy in the form of electrical current

The possibilities of the development and use of hydro-electric power by the Hydraulic Power Company and its customers have had a curious result upon the fortunes of the Company itself. Under the limitation contained in the confirmatory act of the state of New York the Company could only divert, for power purposes, 9,500 cubic feet of water per second. This volume of water, compared to the total flow of the Niagara River, would be wholly insignificant, but the success of the American companies inspired the Canadian government to grant three separate charters to power companies to be located on the Canadian shore immediately above the Falls, and in about the year 1903 these companies began to construct their plants. This was the signal for a hue and cry which resulted in Federal legislation greatly to the advantage of the Canadian companies at the expense and to the disadvantage of the Hydraulic Power Company.

A history of this Federal legislation is interesting. Under authority of an act of Congress of 1902, supplemented by action on the part of the Canadian government, an International Waterways Commission was constituted, which investigated the subject-matter and made a report in which they recommended that diversions for power purposes be limited as follows: on the American side to 18,500 cubic feet per second; on the Canadian side to 36,000 cubic feet per second. The 18,500 cubic feet per second to be diverted on the American side they recommended be divided as follows: to Niagara Falls Power Company, 8,600 cubic feet per second; to Hydraulic Power Company, 9,500 cubic feet per second; to Erie Canal or its tenants 400 cubic feet per second—total, 18,500 cubic feet per second.

Upon the strength of this report the Congress of the United States, claiming jurisdiction upon the rather far-fetched grounds that navigation of the Niagara River and the Great Lakes or the international defences might be affected by the power diversion, assumed to act in 1906, but in the law which Congress passed, instead of limiting the diversion to 18,500 cubic feet as recommended, the limit was placed at 16,500 cubic feet per second, and the Secretary of War cut down the diversion of the Hydraulic Power Company from 9,500 cubic feet per second, as recommended by the International Waterways Commission, to 6,500 cubic feet per second. This act of Congress, known as the Burton law, provided for negotiations with the government of Great Britain upon the whole subject-matter, and, pursuant to the act, a treaty was subsequently negotiated with Great Britain, which was promulgated May 13, 1910. Under this treaty diversion on the American side is limited to a daily diversion at the rate of 20,000 cubic feet per second, while on the Canadian side the limitation is fixed at 36,000 cubic feet per second. But notwithstanding the treaty to fix the diversions on the American side at 20,000 cubic feet per second,



the Federal Congress did not enlarge the limit of 15,600 cubic feet per second fixed by the Burton law. The net result of the Federal legislation has been to prevent an American company from utilizing 3,000 cubic feet of water per second, and to allow the Canadian companies to use on the Canadian side the same 3,000 cubic feet of water per second from the same pool, having the identical same effect upon scenic conditions as the diversion would have had upon the American side. More than all this, the 3,000 cubic feet of water per second so diverted on the Canadian side is utilized under conditions which produce between 10 and 15 horse-power per cubic foot of water used, and when the power is so developed it is transmitted to the United States for use here. If this 3,000 cubic feet of water per second were utilized by the Hydraulic Power Company on the American side it would produce 20 horse-power per cubic foot of water used and be much nearer the actual place of utilization. The 3,000 cubic feet of water per second which Congress has attempted to cut off from the oldest American water-power company, and the American government has consented may be used on the Canadian side, produces there from 15,000 to 30,000 less horse-power than could be quickly and economically developed from it by the Hydraulic Power Company, which not only uses the water it diverts under the highest head of any of the Niagara power companies, but also with the greatest efficiency.

The controversy which at one time existed between the advocates of the æsthetic values of Niagara and the advocates of the economic values of the Falls may be said to have been settled by the long and patient investigation conducted upon the subject, by which the amount of the diversion for power purposes which could be safely allowed was fixed at 56,000 cubic feet per second. It may be said with assurance that, except under extraordinary circumstances, the human eye has not been able to detect any difference in the flow of water over the falls from the flow of twenty years ago.

At an actual government test made a few years ago, when all power plants were shut down for twenty-four hours to ascertain what effect, if any, the diversion had upon the water at the brink of the Falls, it was ascertained that the diversion lowered the American Falls about one-half an inch and the Horseshoe Falls about three inches at their crests. A falling mass of water of the depth of eleven or twelve feet has the same effect upon the sight and imagination as a falling mass of water of the depth of fifteen feet. The human mind is easily aroused in the interests of the preservation of a natural wonder like the Falls, and doubtless the American public has been greatly prejudiced by writings and pictures giving a wholly ridiculous and exaggerated view of, rather than actual conditions of, the Falls. That proper remedial works would enhance the beauty of the Falls is the best judgment of the engineers who have given the subject careful study, and that the full amount of diversion on the American side of 20,000 cubic feet per second would in no manner impair the full beauty or sublimity of the great Falls is not disputed by those who have given the subject any intelligent study.

What has Niagara power done for human comfort? It has driven the darkness out of vast cities from Buffalo to Syracuse, and has added the joy of electric illumination to the farm-houses and villages between; it drives the electric car and lights the steam-car; it solidifies and converts into ice some of the very waters of the Niagara River itself, thus insuring a large and economical supply of a modern necessity; it extracts nitrates from the air to replenish the soil; it hardens the steel and adds to the safety of the rails of our great highways of commerce; it produces thousands of tons of aluminum, our lightest and strongest of metals; it supplies in tremendous quantities our foods and their constituents; it carries information and intelligence not only through its use in connection with telephones, but in the manufacture of print paper, and in many other ways makes proof that "it was not intended in the dispensation of a wise Providence that while men's backs were bowed in labor the great power of Niagara should go wasted and unused to the sea." * *

THE ANACONDA COPPER MINING COMPANY

By CHARLES T. SHEARER

BACKED by the resources of an empire, the Anaconda Copper Mining Company, a splendidly equipped and perfectly adjusted industrial machine, is, year after year, demonstrating that copper-mining is a business, sound and stable, wherein the element of chance has been eliminated in so far as is humanly possible. Since its organization by the late Marcus Daly it has added many hundreds of millions of dollars to the wealth of the country; it has indirectly built and supported towns and cities, and it has had and still has an important part in the development of two states, one of which, the third largest in area in the Union, has natural resources that in extent and variety are not surpassed by those of any commonwealth of America.

Based on its operations of last year the Anaconda Copper Mining Company produces and distributes more than $100,000 daily before it earns a penny for itself. Of that average daily expenditure $50,000 is paid by it for labor; $16,000 for freight; $13,000 for fuel and power; $8,500 for lumber and timber; $7,400 for supplies, and $13,200 for taxes and other expenses. In the last five years it has distributed the amazing sum of $208,279,332, of which $189,830,754 was paid for labor and material, mostly in Montana, and $18,466,548 as dividends. This in brief is the story of the Anaconda Company, which with its holding concern, the Amalgamated Copper Company, leads a district that produces at Butte, Montana, within an area of less than four square miles, one-seventh of the copper output of the world.

In relation to its employes the position of the Anaconda Copper Mining Company is unique. Labor-leaders familiar with conditions have asserted that no other huge industrial concern treats its employes with the same liberality displayed by this Montana company. In a period covering more than one-third of a century its miners never have been on strike. Its employes in all departments are paid the highest wages in the world for like class of labor. In 1912 its 13,941 employes were paid $16,818,284, an average of more than $1,200 a year. If account were taken of the men in coal-mines, on railroads, and elsewhere in the employ of the company and not previously referred to, the showing would be even more remarkable. These figures are impressive. Their like cannot be duplicated by any other great industrial concern. The average wage of men in similar occupations as shown by the last federal census is little more than one-third the average paid by this company, one-half of whose operating expense approximately is represented by this item.

In other ways the same liberal policy prevails in respect to the company's treatment of its employes. At best a hazardous occupation, mining at Butte is made as safe as it is possible to make it. Absolutely nothing is left undone by the company to protect its underground workers. Every tried safety device and method known to modern mine management is employed throughout its workings in the depths and on the surface. It is a fact well understood by the men themselves that more than seventy-five per cent. of the accidents in this company's mines are due to carelessness in disregarding its rules governing mining operations. Working conditions in the Butte mines are as good as can be. The eight-hour day prevails in the company's mines and smelters, and the men are given the benefit of a sliding scale so that their wages are automatically increased in the event of higher prices for copper, while they never go below a fixed minimum. Rarely is the company a defendant in damage suits for injuries sustained by employes in its service; in all cases of differences it goes more than half-way toward effecting satisfactory settlements. In short, its policy is dictated by a humane and liberal view. From mucker to mine superintendent all its employes are treated with consideration.

No mineralized region on earth has more of interest than the Butte district. In some particulars its history is unlike that of any other great mining center. True, its first chapters were dramatic. First a placer district, its great quartz leads attracted little attention until the auriferous deposits nearby had become exhausted. Then came silver-mining, to be followed by the era of copper. In those pioneer days fortunes were made and lost overnight in the way common to Western mining camps; but soon the industry established itself on a firm basis, and for many years there have been in Butte neither ups nor downs worthy of especial comment. The district has produced steadily; as depth was attained greater ore bodies were encountered, and additional costs incident to mining from deep shafts were more than counterbalanced by economies of operation and treatment. The value of the metal product of the Butte district from discovery is placed at one billion dollars. And mining is believed to be still in its infancy at Butte. For the oldest and deepest mines of the world are copper-mines. No district ever a large producer of copper has been abandoned. In Butte ore always is ahead of mining. The Anaconda Company has tremendous ore reserves which would enable it to produce at its present rate for many years without extending development. As a matter of course that would be contrary to the policy of this great company, which constantly is extending its reserves. It has a vast area of virgin ground yet to be prospected, in addition to the ore bodies that reasonably may be expected to continue with greater depth.

The Anaconda Copper Mining Company last year produced 295,000,000 pounds of copper. Gold and silver, with it merely by-products, in themselves constitute an important item. For last year the company's ores yielded 11,250,000 fine ounces of silver and 61,000 ounces of gold. In the course of the year the company mined and reduced four and a quarter million tons of ore.

The underground workings of the Butte mines of the Anaconda Company aggregate 1,800 miles. The shafts of these properties, if placed end to end, would represent a vertical hole extending ten miles below the earth's surface. The mines are connected, and a man might, if he chose, travel for days underground in them without crossing his tracks or coming to the surface. From these workings are now being hoisted 15,500 tons of ore daily. This ore is sent to the Anaconda smelter, the greatest works of their kind in the world, and to the smelter of the company at Great Falls, itself a large plant and embracing many features new to reduction plants. Eleven thousand tons of ore are sent daily to the Anaconda works, and the remainder of the output is treated at Great Falls. These two smelters consume an average of 700 tons of coal and 625 tons of coke daily.

Where mining operations are on such a colossal scale the supplies required annually amount in the aggregate to an amazing total. In the course of a year the Anaconda Company's properties use 75,000,000 feet of lumber and 250,000 round timbers for mine props. A forest goes into these mines every year, and the timber, once in place underground, never comes up.

The company uses 4,000,000 pounds of dynamite in its mines each year. This explosive is better known as giant powder, and is employed in tearing down rock and ore. Other supplies are used in proportion. Under the one item of supplies the company expended last year more than $2,600,000, this sum not including the amount paid out for fuel and timber. The Anaconda Company's taxes in the state of Montana amount to almost $2,000 a day, 365 days in the year. In several communities it pays a very large per cent. of the total cost of the local government.

One reason for the Anaconda Company's leadership in the copper-mining industry is due to the fact that it is in advance of the times. It effects economies of operation through methods not generally employed, and which, in not a few cases, were originated by it. These savings, it may be said, are not brought about at the expense of labor or the communities that, to a greater or less degree, are dependent upon it. Its general policy is to maintain its properties and plants at the highest possible state of efficiency. It operates on the theory that the best of everything, including labor, is the cheapest in the end. The company, then, depends upon system and improved methods of operation to effect those economies that are necessary in the successful conduct of great industrial operations.

Chief of these economies in the case of the Anaconda Copper Mining Company may be mentioned its applica-

Type of a Butte Skyscraper, with a basement 3000 feet deep

The picture represents the Diamond Hoist with a steel head frame 108 feet high. The tallest head frame in the district is at the Leonard mine, also one of the Anaconda Copper Mining Company's properties. It is of steel construction, and is 158 feet high.

tion of electricity to mining and smelting. Although the company began to use electricity in its mines for power as far back as 1902, it was not until recent years that the greatest advance in this direction has been made. At present the company is purchasing of the Montana Power Company, controlling great plants on the Missouri River near Helena and Great Falls, and elsewhere in that state, 33,000 horse-power, all used in the operation of its mines, smelters, and local transportation lines. This means that steam power to that amount has been supplanted by electrical energy. As a matter of fact, the company will use much more electrical power later in the year, as the Butte, Anaconda & Pacific Railroad, which conveys the ores from Butte to the Anaconda smelter, and which conducts a general transportation business, is about to be electrified.

Gradually electricity is replacing steam in all the mining operations of the company. Electric power compresses the air with which the great hoisting engines of the district are operated. Not all of the mines have as yet been equipped with these air-engines, but they will be in time. Electrical power indirectly drives the air-drills which are in use in all underground workings. The tramming in the mines is being done with electrical energy. The ore from the mines to the Anaconda smelter will be transported in trains pulled by electric locomotives, several of which already are in commission. At the smelters the copper-bearing rock is crushed by electrical power; the concentrating machinery is operated by the same force; in fact, electricity is now being used at every step in the mining and smelting of the Anaconda Company's ores. The application of electricity to the mines is effecting a great saving. There was a time when the builders of hoisting machinery were of the opinion that steam never would be supplanted as a force for the lifting of heavy loads from great depths. That day has passed. The Anaconda Company's air-engines are capable of developing 3,000 horse-power. They can hoist with ease a gross load of twenty tons from the deepest workings in the district, and they are proving as adaptable in every way as the old style of engines. The deepest workings in the district are 2,800 feet, one shaft being down 3,000, and an air-driven engine is adequate there.

As further evidence of the enterprise of the Anaconda Company management may be cited the electrification of the railroad connecting its mines in Butte with its smelter at Anaconda. That road, the Butte, Anaconda & Pacific, was built in 1893 by Marcus Daly, and is said to be the busiest road of its miles in the world. Its main line is 26 miles long, but with its side tracks it operates 140 miles of trackage. No steam road in the world was better equipped or better maintained, but when the company became convinced that it could successfully apply electrical energy as the motive power for the line, it lost no time in bringing about the change. This is to go into effect in a few months. An overhead trolley system will be used, and electric locomotives of the latest type and built especially for it will be employed to move its passenger and freight trains between Butte and Anaconda. The eyes of railroad men generally are on this road, for it is the pioneer in the matter of electrification. No other line where the usual difficulties in the way of grades and curvatures are encountered has been electrified throughout.

Not alone in its mining and transportation departments is the Anaconda Company leading. Its smelters are models of their type. They attract experts from all over the world, who go to Montana to study mining and metallurgical developments. At the Great Falls plant is located the highest stack in the world. This chimney is 506 feet high, and has an inside diameter of fifty feet. Attached to this stack are condensing flues constructed for the purpose of eliminating objectionable dust and gases. In much the same way the solid particles from the gases passing through the furnaces at the Anaconda plant are controlled. Some of the Butte ores contain compounds of arsenic, and a department is maintained at the smelting-plant to dispose of it and other obnoxious elements. The question has received much attention, and nothing has been left undone to arrive at a solution of the smoke problem. European as well as American experts have been employed, and elaborate tests and experiments conducted, with the result that the Anaconda Company has the situation well under control. The department referred to recovers daily from one to two tons of arsenic from the smelter fumes, which are cleaned and cleared of objectionable gases in large part before escaping through the big stack. The arsenic recovered by this method is a commercial product, and all of it is shipped to Eastern markets.

While not small in anything, the Anaconda Company turns to account products that might easily go to waste. For instance, the water pumped from the mines of the company is a weak solution of copper sulphate, which is recovered in a novel way. By permitting this water to flow over scrap iron in suitable sluice-boxes, the copper it contains is precipitated. More than 6,000,000 pounds of copper, having a value of $900,000, are recovered annually by the Anaconda Company through this method.

So vast are the operations of the Anaconda Copper Mining Company that its influence must be widespread. In Montana in particular is this influence felt, for in that state communities widely separated are in large part sustained through the activities of the concern. Prior to and during the so-called copper war, the Anaconda Company was forced, through considerations of self-protection, to enter into several lines of business that had no direct connection with mining. That time, happily, long since has passed. The company now attends strictly to the business of copper-mining and copper-making, and it has disposed of practically every subsidiary concern, however small, that is not directly associated with mining or smelting. Contrary to the opinion that is held in some quarters, it does not control or own stock in any of the great power plants now combined under the name of the Montana Power Company, but is the chief patron of that concern. It owns great coal-mines and vast timber resources. It manufactures some of its lumber, but does not depend wholly upon its own plants for fuel, stulls, or sawed timber. It buys its supplies in the open market, and as it wants only the best and is willing and able to pay for it, its patronage is appreciated everywhere. It has nothing to sell except copper, with its by-products of silver and gold, and, vast as it is, it does not pretend to control the copper-making industry. Conducted on system, as a great business should be, it has made its credit the best in the world. Having effected substantial economies through a splendid organization, wise combination and the application of advanced methods, it is sharing its prosperity with its employes, who receive the highest per capita wages, their class considered, paid on earth. It is, in fact, a conspicuous example of the best in big business, and might be taken as a model by many industrial concerns with profit to themselves and the communities in which they operate.

The early history of the Anaconda Company forms one of the most interesting chapters in the story of the copper-mining industry. Associated with Marcus Daly in the organization of the company, known then simply as a partnership, were J. B. Haggin, William Hearst, and Lloyd Tevis. These men had their places, and a conspicuous place, in the industry, but it was the genius of Mr. Daly who made the name of the mine he developed a household word in Europe as well as America. The partnership was succeeded by the Anaconda Mining Company, which in 1895 was followed by the Anaconda Copper Mining Company. The Amalgamated Copper Company, a holding concern, was organized in 1899 to control the Anaconda and subsidiary properties. These, in 1910, were merged into the Anaconda Copper Mining Company. Mr. Daly was the first president of the Amalgamated. Up to the time of his death his was the dominating spirit in the industry. An heroic figure in bronze, the last work of St.-Gaudens, was erected to his memory in a commanding place on Main Street, Butte; but his greatest monument is the city itself, made possible by the development of the mines whose future he foresaw. Mr. Daly was succeeded as president of the Amalgamated by Mr. H. H. Rogers. On the latter's death, May 19, 1909, Mr. John D. Ryan, another wizard in the world of copper, who had been president of the Anaconda, assumed the presidency of the holding company, which office he still holds. Mr. B. B. Thayer is president of the Anaconda Copper Mining Company, having succeeded Mr. Ryan upon the latter's advancement. ***

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ALEX. D. THOMSON, Grain Dealer.
LUTHER MENDENHALL, Investments.
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DAVID WILLIAMS, Vice-President.

AMERICAN EXCHANGE NATIONAL BANK OF DULUTH

ESTABLISHED 1879

CAPITAL	*$ 500,000.00*
SURPLUS (EARNED) . . .	*1,000,000.00*
UNDIVIDED PROFITS . . .	*400,000.00*

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ACCOUNTS OF BANKS, BANKERS, CORPORATIONS, FIRMS AND INDIVIDUALS RECEIVED ON THE MOST LIBERAL TERMS CONSISTENT WITH SOUND BANKING

CAREFUL ATTENTION GIVEN TO COLLECTIONS

Recreating the Nation's Wealth

By J. B. White

THERE is going to waste, on its way to the sea, water power enough in this country, if harnessed and converted into electricity, to light and heat the homes and turn the wheels of the factories and run every street-car and railroad train in the United States. Water-power sites on the public domain should be held for the people and leased for their benefit to power companies at a fair rental. The state can condemn private property for public uses, under the right of eminent domain, and sites not on state waters and not now utilized should be acquired by the state for the use of the people. This water power of the rivers and streams can be used over and over again, being multiplied as many times as the water can be raised by a succession of dams. Thus, while the wheels do not turn from the water that is passed, other wheels all along the stream below do turn, and then the sun pumps the water back again to its source, and the same process is endlessly repeated.

The practice of forestry and the conservation of our timber resources are of immense importance, not only for the intrinsic value of the wood and the lumber, but also in many parts of the country for holding back the snows and storing the water at the heads of the streams in the mountains, thus preventing disastrous floods in the country below.

But who shall plant lumber trees? Who shall practise forestry? The planting of fruit trees is a commercial business, as they mature to bear fruit in from four to twelve years. Capital invests, choosing favorable soil and climate; and the harvest comes twoscore or more times during the lifetime of him who plants; and he sees and enjoys the fruit of his labor. But with lumber trees there is only one crop in a generation. As an investment it is not as attractive, with laws of taxation as they are now, as other opportunities which long experience has proven less hazardous. One must figure compound interest—at, say, six per cent., to make it safely attractive—cost of cut-over lands, cost of setting out trees and caring for them for fifty years, annual taxes for fifty years before the crop is harvested, and taking chances as to the value of stumpage at the end of that time.

In European countries it has been found most economical that the government or state shall grow the forests. The state pays no taxes, can get money at a lower rate of interest, and can establish and maintain a uniform system of forestry under the charge of educated and trained experts. When the crop has matured to a point where cost has met value of product, so that it would be at a sacrifice of profit and a waste for even the state to maintain carrying charges, then the trees should be harvested, the land grubbed of its stumps and the process repeated for another crop. It is surprising how much can be grown on an acre by intensified forestry, where trees of the same age are planted in rows or at proper distances from each other according to contour and nature of the ground, and are intelligently pruned and tended.

On the Pacific coast it has been ascertained that a thousand feet per acre per annum can be grown, or forty thousand feet per acre in forty years. In the Vanderbilt forest near Asheville, North Carolina, I saw stands of White Pine ten inches to one foot in diameter which had been grown from the seed in eighteen years. In the different states, such soil should be selected for forestry which is not so well adapted for annual crops of agriculture, yet well adapted for tree growth. And the work should be done by the state.

We can never make it profitable to grow trees to an age of the present old-growth forests of one hundred and fifty years or more. But these old trees have obtained their growth; they have long been ripe for the harvest; and a rapidly increasing population and the demands of other countries are calling for the marketing. Most of this acreage is not improving. In most instances, at the best it is only holding its own. Growth of mature trees has stopped; and trees are dying to fully offset the gain of new growth; and when fires come, the old and the new growth are both swallowed up in flames. The Forest Service is doing most valuable and valiant work in protecting and saving the forests from disastrous fires. The government appropriations for this work should be most liberal and should be supplemented and aided by appropriations and appointment of forest field men and fire wardens from each state.

We are far behind the older nations in the practice of conservation. But we have awakened in time. It is not now too late to care for the present and insure for the future.

Gay & Sturgis

Gay & Sturgis are members of the New York and Boston Stock Exchange. Complete facilities are provided for handling transactions in all mining, industrial, and railroad stocks traded in on these Exchanges, but the traditions of the house and the location of its three Western branches in the mining centers of the Lake Superior copper and iron regions, have built up an investment following whose preferences are distinctly in mining stocks.

This firm and its direct predecessors, in which the present firm members were partners and associates, have been members of the Boston Stock Exchange over 25 years. The members of the firm are Harry H. Gay, Irving J. Sturgis, and R. Linzee Hall.

Mr. Gay became a member of the Boston Exchange December 28, 1887, and at the present time is Vice-President of that body. In 1889, at the beginning of his business career, Mr. Hall entered Mr. Gay's employ and later became his partner. On March 1, 1897, the firm of Stackpole & Gay was organized, Mr. Henry Stackpole having been a member of the Boston Exchange since April 29, 1876.

Mr. Sturgis began his business career in Houghton, Mich., and then went to Boston and entered the employ of Stackpole & Gay, becoming a member of the firm January 4, 1899. On January 31, 1903, Mr. Stackpole retired and the present firm was established. Mr. Sturgis is a member of the New York Exchange.

An accessory of this house, which gives it peculiar advantage, is its private telegraphic service with Duluth, Minn., Houghton and Calumet, Mich., where its western branches are maintained. The operators in these offices are in direct communication with the home office in Boston without relay. To show the effort made to maintain this unrelayed communication, it may be cited that during the recent devastation by floods in Ohio and Indiana, a route was connected up by way of Atlanta, Ga., Nashville, Tenn., Little Rock, Ark., St. Louis, Mo., Burlington, Ia., and Chicago, Ill., through to Duluth, a distance of 5,100 miles, and over this line the operators sent their messages without interruption.

This service enables the western offices to send to the east instantaneously any news of importance that develops there, while the east likewise keeps the west advised regarding transactions on the floor of the Exchanges, as they take place. As the managements of many important Arizona, Montana, and Utah mining companies have their offices in Duluth, Houghton, or Calumet, an intimate knowledge of activities in those regions is also made possible. ***

Early Brewery History

Chapter 29 of the Minnesota State Laws of 1860 provided "An act to encourage the manufacture of pure Lager Beer, with which to discourage the use of alcoholic liquors." The words of the act imply that beer was then not regarded as an alcoholic liquor.

This act provided that no license was required for the purpose of selling such Lager Beer, if manufactured in the state. There were many other states which encouraged the manufacture of beer on similar lines, right in the teeth of the prohibition movement of that period, which movement at that time was really not intended to include Lager Beer, as witness the prominent old "Washington Society" and others. For instance, there was no Lager Beer in the State of Maine when, in 1852, it passed its famous prohibition law. Maine was even careful enough to exclude cider and hard cider from the list of forbidden drinks, although it contained some eight or ten per cent. of alcohol. If Lager Beer had then been known in Maine, the good people would have certainly not forbidden its use, for Lager Beer has only three and one-half per cent. of alcohol.

The present agitation against Lager Beer is comparatively a new move—a move which many of our best citizens hold to be in the wrong direction. It is almost too much to believe that that which half a century ago was hailed as a temperance drink, with which to discourage the use of alcoholic liquors, should to-day be regarded by some as more dangerous than distilled liquor itself.

The introduction of Lager Beer in the early fifties of the last century has kept down the use of the heavier porter, and has now developed into a big industry, and Minnesota, and especially Duluth, now boast of some of the finest breweries in the country. Minnesota raises the best brewing barley of all the states—always highest in price, but always richest in starch and albumen, and it is not to be wondered at that this in itself has stimulated the industry. ***

DULUTH BOARD OF TRADE

THE Minnesota legislature of 1913 subjected the grain trade of the state to a searching investigation, in the course of which the government, rules and regulations, and methods and conditions under which grain is handled on the two exchanges of the state, located at Duluth and Minneapolis, were inquired into thoroughly and persistently. In the Northwest interests antagonistic to the organized exchanges have been perniciously active for a number of years, and in their efforts to incite prejudice against grain handlers in the terminal markets have been vicious in their attacks. It was these interests that were largely responsible for bringing about the legislative inquiry, and in its conduct they had a considerable voice. They went after the exchanges with a zeal worthy of a better cause. With a committee that supported their line of inquiry they attacked the exchanges and their methods and the business conduct of their members, and feeling was soon at white heat. The grain investigation became the feature of the session.

From this inquisition, conducted in a distinctly hostile manner, the grain exchanges emerged with a complete vindication. The committee's report recommended some changes in matters of administration, such as the method of nominating officers, admission of members, etc., these suggestions not being due to any abuse through present customs that had been found, but representing the difference in judgment of the five men on the committee and the several hundred who make the rules of the exchanges. But as to the fundamentals, that these exchanges are great market-places where buyers and sellers meet and trade in the grain grown by the producers of the Northwest, enabling them to market their products with the maximum of safety and minimum of cost, that these market-places are open and free to all, whether it be line elevator, farmers' elevator, independent shipper, or individual farmer, that competition finds full expression, that all shippers are given the protection of the rules of the exchange, and that the commission men render to their clients the best service within their power, there was no criticism. In fact, the following acknowledgment was made:

"We find that the grain markets of Minneapolis and Duluth handle the bulk of the grain produced in the Northwest. The business of buying and selling grain at each of these terminals is well organized, and the commission men generally have adopted a method of promptly and accurately reporting all trade made by them. There seems to be no opportunity or inclination for individual traders on these markets to engage in any practice detrimental or unfair to either the shipper or receiver of grain."

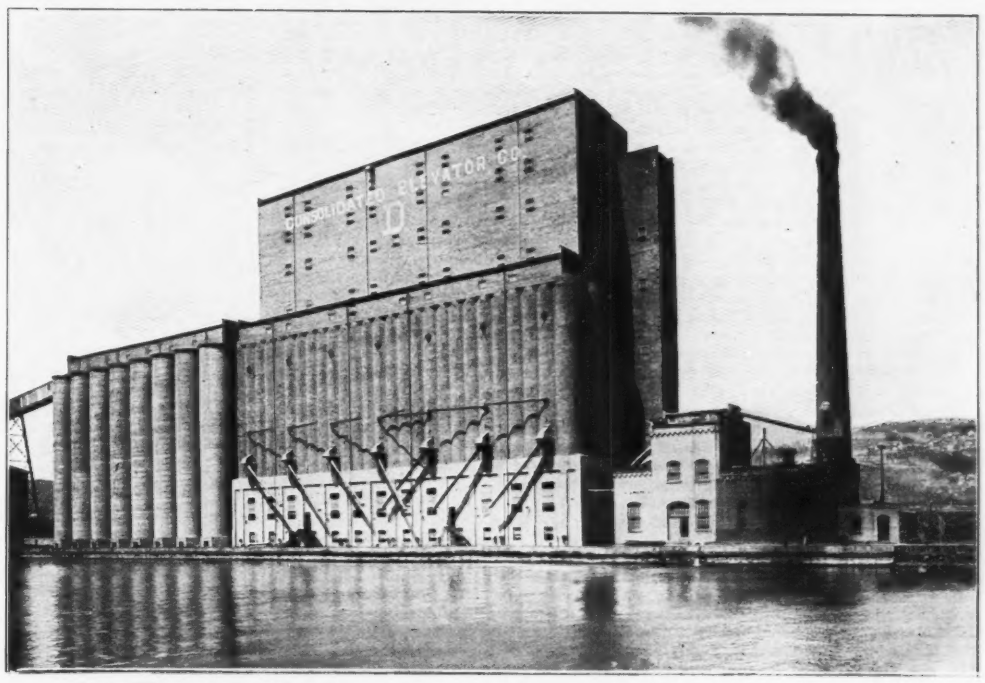
That an investigation conceived in enmity should, after two months of examination and reflection, be compelled to acknowledge that their business is fairly and honestly conducted is a result in which the Minnesota exchanges find much gratification. To all exchanges it is of keen interest, for it has always been their claim that an examination of their purposes, and the condition under which business is transacted, could produce no other verdict than the one given by the Minnesota Committee. To the entire business world it is of much concern to know that the marketing of the nation's tremendous production of grain is conducted safely, economically, and effectively.

The exchanges of the entire country can find an especial satisfaction in the result of this Minnesota investigation in the fact that, after vigorous inquiry into the system of trading in contracts for future delivery, the feature of exchange trading which is the object of so much attack, from those who measure its usefulness by the disaster that comes to those who misuse it rather than by the great service it renders to the vastly larger number who employ it for the legitimate purposes for which it has been evolved, the committee found that "we believe any transaction in futures is legitimate and commendable where the parties engaged have an actual purchase or sale to hedge or protect, and where by reason of experience, business sagacity, and ample means, they are fitted to engage in such business."

At the hearings of this committee there appeared a number of representatives of farmers' elevators, who testified to the value to them not only of the grain exchanges, but of the system of trading in contracts for future delivery. Practically every farmers' elevator to-day realizes this. The great co-operative movement among the raisers of grain, about which so much has been written, and which has unquestionably been of much benefit to the producer in the marketing of his grain, had been made possible by the existence of the grain exchange and its system of trading in contracts for future delivery. The grain exchange offers to the farmers' elevator the opportunity to market his shipments to the same advantage as his competitor. The price at which to buy grain is available to him as well as to the man against whom he has to compete, and it is the same price for both. When he has bought his grain he can immediately sell it for future delivery at the terminal market. The system of trading for future delivery is his salvation, for it relieves him of the necessity of speculating on his purchases. Without this the buying of grain would be in the hands of those financially able to take the heavy risk of carrying grain, this necessarily confining it to fewer numbers, and against this competition he could not survive.

It is the commission man in the terminal market who has made the farmers' co-operative movement in the Northwest the success that it is. He is not only the medium through which the farmers' elevator can sell his grain in the terminal market on equal terms with his competitor, but in nearly every case he has financed the elevator for which he does business, providing the capital which it must have in order to be constantly in the market for grain at its local station, and often providing a considerable part of the money with which the elevator is built.

The progress of the co-operative movement, as represented in the grain-growing territory by the farmers' elevator during the past four or five years, has been so marked as to leave no room for doubt that it is effecting a change in the system of marketing grain in the country. In Minnesota in the year of 1909 there were 1,038 houses owned by what are known as line companies—that is, companies controlling a number of houses, generally along one railroad line, and in some instances several. In 1912 the number had dropped to 777. Farmers' houses increased from 189 to 238, and independent houses from 283 to 300. In North Dakota and South Dakota the same growth has been made.



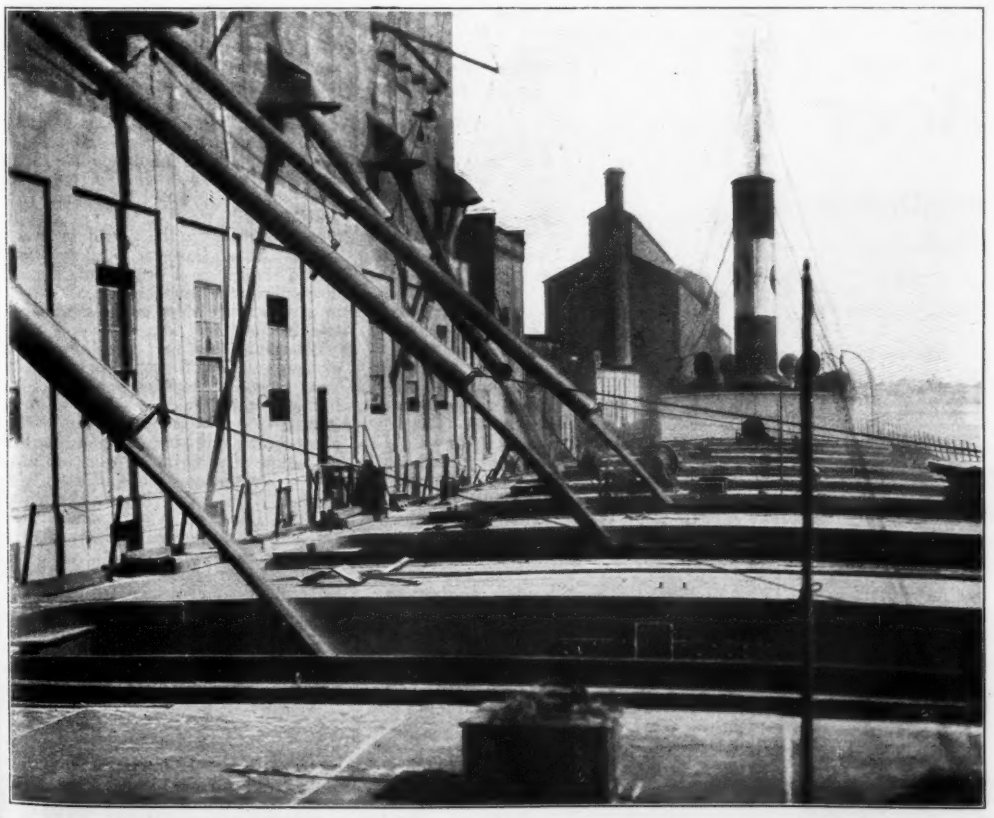
Grain Elevator of the finest type, of concrete and tile construction, and absolutely fireproof

Another very important part played by the commission man in the success of the farmers and independent elevators is in bringing them to safe methods of doing business and eliminating speculation. The grower of grain is always a believer in higher values, and very often is willing to take a chance on his conviction. Associated collectively in the management of an elevator, they are sometimes inclined to do the same thing. The commission man in the terminal market, with his much wider experience and opportunity for observation, knows that this spells inevitable disaster, and, with his money furnished to finance the buying of grain by that house, he insists that there shall be no speculation; that as fast as grain is bought it shall be hedged by a sale in the terminal market. He knows that every bad failure in the grain business can be traced to speculation; that the country buyer of grain who makes a failure because he takes too small a margin and runs into losses is a rarity. Strict requirement is made that the country elevator that gets money shall do business without incurring risk.

The grain exchanges are also striving to educate not merely the farmers' elevators but every country shipper in this direction. The Duluth Board of Trade requires that every traveling man who goes to the country as a representative of a grain firm represented by membership on the Board shall be licensed, and this license is granted only after a personal examination of the applicant. During the inquiry his attitude as to speculation in grain is ascertained, and he is fully informed as to its dangers and the hazard that any buyer and shipper of grain takes if he indulges in it. It is impressed upon him that to make the grain business safe and prosperous speculation must be stamped out. There is a more or less general impression that grain men seek the speculative as well as the actual handling trade in grain, but this is wrong. Very few solicit, and most of them absolutely refuse it.

The result of this policy has been a vast improvement in the manner in which the grain business is conducted. Failures are few, and the co-operatives are learning that with competent management and conservative methods their business will be successful. It is operating to the advantage of the grain exchanges also, for it is bringing the country shippers to see that the grain man at the terminal is interested in their success.

The value of a well-organized grain exchange is most keenly appreciated by the shipper of grain when he has been mulcted by some concern that attempts to operate independently. Generally it is one that attempts to get business by appealing to prejudice, claiming the exchanges are a monopoly, and their members all knaves. They are always successful in getting some business from those who forget that the only reason the concern that attracts him is not operating as a member of a grain exchange is because it could not gain admission. It is not much more than a year ago that a concern began soliciting business from shippers doing business with the Duluth Board of Trade members, claiming ability to handle the business to better advantage. The Duluth man saw the grain being sold to Duluth buyers at prices no better than they themselves could have handled it for, and often poorer, for there are no more skilful salesmen in the world than the grain traders on exchanges. One day the concern's doors were closed, and the proprietor was missing with about $25,000 of money belonging to country shippers. If the head of that concern had been able to go before the Duluth Board of Trade and satisfy it of his financial responsibility and his integrity, he would never have been soliciting business as an independent. Any concern which attempts to gain business upon the representation that one of its advantages is that it does not belong to an organized grain exchange deserves the application of careful examination by any shipper who is inclined to give it business. The grain exchanges do not claim that none of their members ever fail, or that they have never been known to be dishonest, but they do claim that the careful scrutiny given every applicant before admission has reduced dishonesty and insolvency to the minimum, until membership in a well-organized exchange has now come to be practically a certificate of responsibility and business character. ***



Loading lake freighter with 400,000 bushels of grain. Each of the loading spouts discharges 20,000 bushels every hour

The Dairy Land of the North

The dairy industry demands location, climate suited to the growth of a hardy prolific strain of stock, accessibility to market, pure water in abundance, and a soil and climate fit and proper to produce bountiful feed for cattle. The Lake Superior dairy region of Michigan and Wisconsin fills all these requirements more perfectly than that of any other region in the Middle West. With a climate uniform in temperature, free from frosts for an average crop-growing season of 140 days, and naturally rich soil which does not freeze in the winter-time, and with a rainfall averaging from 26 to 36 inches, this region is unquestionably peculiarly fitted for the growth both of roughage for the dairy cow in the shape of root crops, and for the production of silage corn, timothy, clover, alfalfa and other grasses.

The yield of clover is so luxuriant as to justify the name "CLOVERLAND," which has been recently appropriated by the dairymen of the north.

With the advent of farmers from the older settled portions of the West dairy farms with the inevitable silos have sprung up, and practical demonstration has justified earlier prediction that this north country would prove the dairyman's Paradise.

In this country of pure water, cool summer temperature, abundance of food for milch cows, and freedom from insect pests, the dairy stock shows a strength of constitution which promises prolonged productivity, both in offspring and in production of milk. Calves show a rapid development seldom seen in sections further south. Markets both for stock and for dairy products are to be found in the regions of Detroit, Chicago and Milwaukee, distant one night's ride from this region, and Minneapolis, St. Paul and Duluth, distant but a few hours.

Many dairy herds of thoroughbred cattle are already in this territory, and furnish ample supply of acclimated stock for incoming dairymen.

The thriving lumber and mining towns of this territory furnish a splendid home market for farmers. The territory is thoroughly provided with church facilities and public schools, and the road systems are becoming the pardonable pride of the region.

Here is a vast undeveloped agricultural empire at the very back door of the teeming population of the Middle West, and waiting to give prompt response to the treatment of the skilled agriculturist.

Through the very heart of this wonderful new agricultural region, from Sault Ste. Marie and Calumet, Michigan, in the east and north, to Duluth, Minnesota, on the west, runs the Duluth, South Shore & Atlantic Ry., with its headquarters at Duluth. This railway has instituted a strongly helpful and effective development work—it employs agriculturists to offer suggestions and advice to farmers, runs demonstration trains, and encourages and aids in the introduction and growth of approved pure seed and pedigreed dairy stock. In short, everything is done to give the farmers the benefit of scientific research and practical knowledge without expense to them.

Here lies an opportunity for a profitable farming investment within a night's ride of Chicago, and such an investment is not without the speculative value enjoyed by farmers of two generations ago in the Mississippi Valley, as land in this region can be now bought for from $10.00 to $15.00 an acre. Comparison is invited between this region and lands, no more productive at least, located a thousand miles farther away from the great central markets.

DAIRY COW OF CLOVERLAND'S FAVORITE TYPE

A BEVERAGE

That's in the Food Class

When you find a beverage that's in the food class — the pure food class — you have one that you can use, not only for the enjoyment that is in it, but for the good that it will do you. Such a beverage is

Rex Bottled Beer

DULUTH BREWING AND MALTING CO., DULUTH, MINN.

HUNTER

BALTIMORE RYE

THE RICHEST PRODUCT OF THE BEST OF MARYLAND'S FAMOUS DISTILLERIES. GUARANTEED BY THE PROPRIETORS UNDER THE NATIONAL PURE FOOD LAW AN ABSOLUTELY PURE RYE WHISKEY

Sold at all first-class cafés and by jobbers.
WM. LANAHAN & SON, Baltimore, Md.

HISTORY OF CENTRAL COAL & COKE COMPANY OF KANSAS CITY, MO.

THE personal equation in the development and progress of any large industrial organization is such a potent factor that a chronicle of the evolution of any such organization is necessarily so closely interwoven with the biography of the men responsible for such development that the history of one is the history of the other, and the Central Coal & Coke Company is no exception. The organization that has finally developed into the Central Coal & Coke Company of to-day had its modest beginning in a retail coal-yard opened in 1871 by Richard H. Keith, and through all the various ramifications of the operations of the concern started at that time is seen the guiding influence of his master mind up to the date of his death, in 1905, when Mr. W. C. Perry was made President, and Chas. S. Keith, son of Richard H. Keith, was made Vice-President. On Mr. W. C. Perry's death, in 1907, Mr. Chas. S. Keith was made President and General Manager, which position he occupies at the present time.

Late in the year 1871 a partner was admitted, and the partnership of Mitchell & Keith was organized, and this firm was later succeeded by R. H. Keith & Company.

THE STAGES OF AN EVOLUTION

During the formative period the style of the firm name was changed several times before the present organization—the Central Coal & Coke Company—was chartered. In 1873 the partnership of Keith & Henry was formed, and this business connection was continued until 1881, when the name was changed to Keith & Perry. Prior to the last-mentioned change, Mr. Keith had opened a coal-mine at Godfrey, in Bourbon County, Kansas, and this mine was operated until the consolidation of the Keith & Perry interests in 1881.

Out of these various partnerships, firms and corporations was evolved the Keith & Perry Coal Company, which, in 1884, was duly chartered by and operating under the laws of Missouri.

When the change of name was made from Keith & Perry to the Keith & Perry Coal Company, the capitalization was $800,000, and operations were continued under the company name with this capital until 1893, when the style of appellation was changed to the Central Coal & Coke Company, an incorporated concern, chartered under the laws of Missouri with an authorized capital of $3,000,000. The increase in the capital stock, and the change in the name, were practically the only changes of importance. Prior to this the operations of the company under the name of the Keith & Perry Coal Company had been a success in all parts of the territory in which it solicited business.

The growth of the company has three distinct stages. It was primarily a retail distributer of coal in a small way; after this business had been developed until it became representative, the second stage of its career began. This was when the company entered the field as a coal-producer. Between the date of the opening of the first mines of the company, the subsequent absorption of those operated by other firms and individuals, and later of the properties of the Kansas & Texas Coal Company, an organization fully as large from a coal-producing point of view as the Central Coal & Coke Company itself, time was found for establishing another branch of business that has experienced a growth equaled by few companies whose sole object has been the production of lumber. In this industry the advance has been so steady and continuous, and on such a large scale, that the department, of itself, would form an epoch in the manufacture of yellow-pine lumber of the South.

Probably a better idea of the growth of the company can be gathered from the number of men employed and the extent of the operations than from any other source.

When the small retail yard was opened on Bluff Street, Kansas City, Mr. Keith probably employed one or two men to assist him during busy seasons. After the formation of the partnership of Mitchell & Keith, this force was doubtless augmented by perhaps a half-dozen more. The firm of R. H. Keith & Company enlarged upon the operations of its predecessors, and when the Keith & Perry interests combined, the value of the firm's property and the number of employés were about doubled.

CAPITALIZATION AND COAL PROPERTIES

In 1900 the capital stock was increased from $3,000,000 to $3,700,000, the additional capital being used to purchase the property of the Sweetwater Coal Mining Company at Rock Springs, Wyoming. The purchase of this mining property gave the company control of two of the largest mines in the West, capable of producing 3,200 to 3,500 tons of coal daily, and employing between 650 and 700 men throughout the year.

The capital stock of the company was again augmented in April, 1902. This increase raised it to $7,000,000, which is the present figure.

EXTENT OF THE COMPANY'S OPERATIONS

The Central Coal & Coke Company is interested in six different fields, producing six different grades or varieties of coal. The quality of the coal ranges from the ordinary steam coal to high-grade semi-anthracite, the latter being acknowledged to be the best coal for either domestic or steam-generating purposes mined at any point outside of the anthracite district of Pennsylvania, and nearly on a par with that.

The coal properties of the Central Coal & Coke Company are located in Missouri, Arkansas, Kansas, Oklahoma, and Wyoming. A total of twenty-nine mines and two washeries is owned and operated, and arrangements are being made to open up new shafts and slopes at a number of places as fast as the product of the additional mines can be utilized. On an average, it requires about 9,000 men to operate the company's mines. The average pay-roll is largely in excess of $10,000 each day. The daily production of coal is about 21,000 tons; of lumber, approximately 1,000,000 feet.

The timber holdings in Texas and Louisiana embrace 175,000 acres of long and short leaf pine.

Its coal lands and leases aggregate 49,000 acres of land, representing about 196,000,000 tons of unmined coal.

The extent of the territory covered by this company in its mining operations enables it to cover the entire western half of the United States. It sells coal from the Mississippi River to the Pacific Coast, and from the border line on the north to the Gulf Coast on the south.

LUMBER PRODUCTION

The development of timber and milling resources of the company has been rapid and substantial. Entering the field with a small mill and a moderate supply of timber lands only, it to-day controls some of the finest standing yellow-pine timber-lands of the South, both long-leaf and short-leaf, and handles the output of four of the largest and best equipped lumber-mills of the South. From a small beginning it has grown steadily, increasing its timber supply as well as the equipment for turning the standing timber into commercial commodities. From the owner of a small circular sawmill near Texarkana, Arkansas, it has developed into an important factor in the production and marketing of long and short leaf yellow pine lumber and timber from its mills in Louisiana and Texas.

The first venture in the lumber business was made in 1893, when the plant of the Bowie Lumber Company, at Texarkana, Arkansas, was purchased. Shortly after the purchase of this mill the company began to improve its machinery, changing the circular to a band saw, and adding many other improved appliances for cutting and handling the product of the mill plant.

Following this, plans for the construction of a new mill were made, and in August, 1893, the ground for a new sawmill plant was broken near Texarkana, and the mill completed and put into operation by the first of the year following, 1894. This is what might be fittingly termed the beginning of lumber manufacture by the Central Coal & Coke Company. Since that time the facilities for turning out high-class lumber have been steadily increased.

A few years after the construction of the sawmill plant at Texarkana, a second sawmill, equipped with planer and all other necessary facilities for caring for the product of the mill, was constructed at Keith, now known as Neame, Louisiana. At the time this mill was built it was one of the most complete in the South in every respect. Time, however, brings improvements in all lines of commercial life, and in no particular have more changes been made in any one line than in the machinery for the production of lumber.

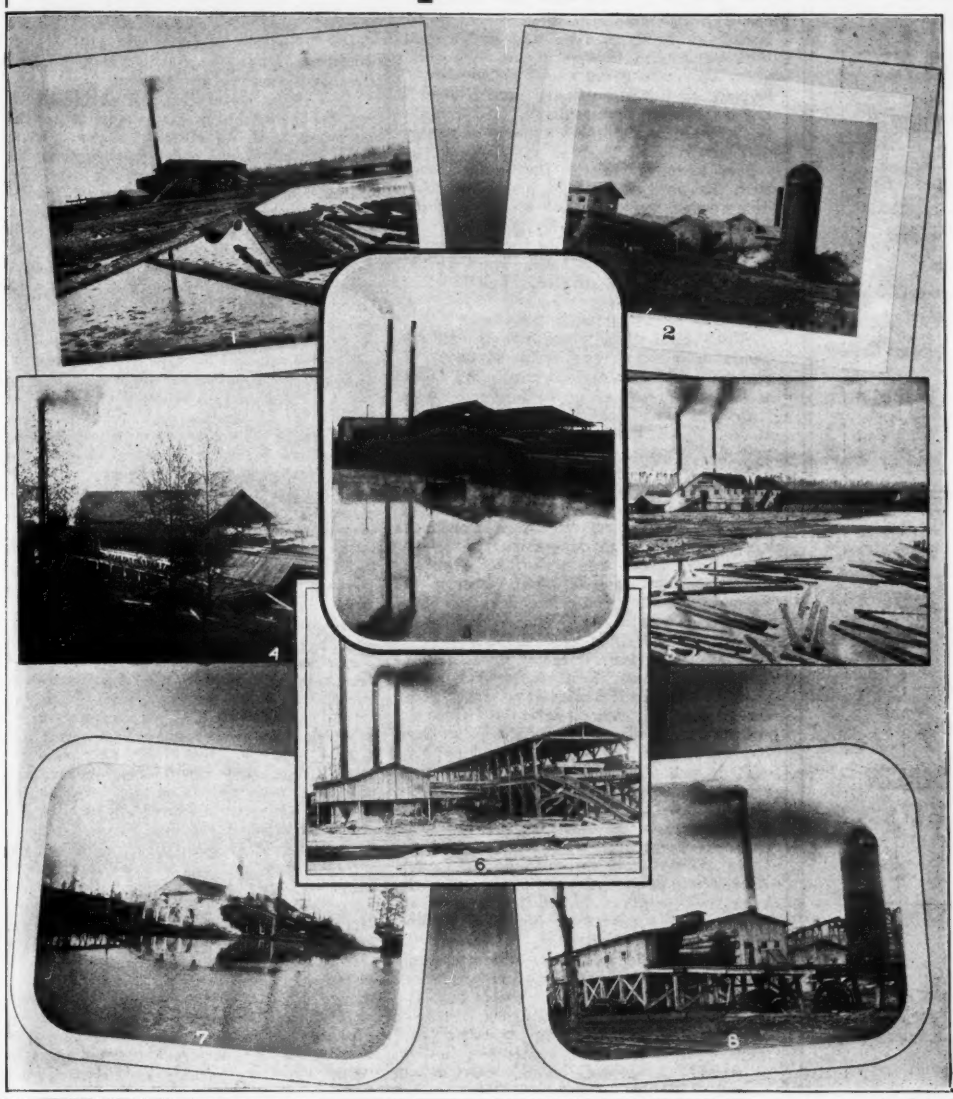
The plant that was once the admiration of the South, while suffering no deterioration, except that which time brings to all humanly constructed machinery, has been overshadowed by a monster lumber-milling plant which the company has been instrumental in erecting in the heart of the short-leaf yellow-pine section of Eastern Central Texas. This is the plant of the Louisiana & Texas Lumber Company, one of the largest and most modernly equipped sawmill plants in the South.

The timber supply for the Texarkana sawmill became exhausted in 1902, and the company secured a large tract of long-leaf pine land in Louisiana, a short distance below Neame, and the Texarkana plant was moved to that timber and reconstructed, the camp being known as Carson, Louisiana.

Another new sawmill is now being planned to develop additional Texas holdings.

This, in a brief manner, is the outline of the company's operations from inception to date. ***

The Most Important Structural Material—LUMBER



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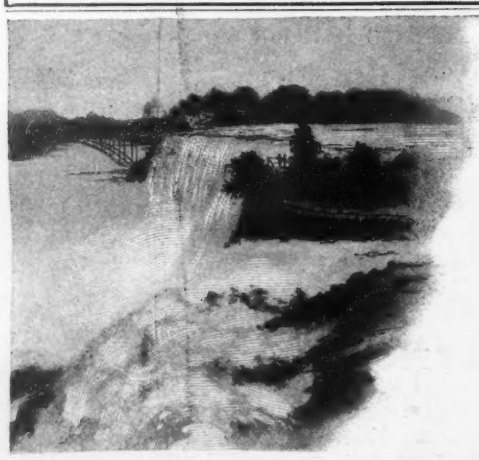

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Broker and Client

By Franklin Escher

A MAN walked into the office of one of the big automobile companies on upper Broadway a short time ago and stated that he wanted to buy a car. "I don't know the least thing about automobiles," he confided to the manager, "and I haven't any particular requirements. All I want is the best car that this amount of money will buy."

The manager talked the matter over with his prospective customer, then took him across the street to a competitor's. "We think we make pretty good cars," he remarked, "but for your purpose the machine these people build is, I think, just a trifle more suitable. You'd better buy one of these."

And then the customer woke up.

What kind of a place you go to depends upon what you want to buy. If you want to buy a certain kind of an automobile you want to go to a place where they have that kind of automobile to sell. If you don't know anything about cars you don't want to go to a place where they make a specialty of any particular kind, but to a place where they sell *all* kinds—and where they don't care what kind they sell you. In other words, if what you are after is *service*, you want to go to a place where they sell service.

There are three distinct classes of firms in Wall Street. The first sell service and service only. The second make a business of selling service, but carry a line of securities for sale on the side. The third class of firms, frankly and openly, merchandise securities exactly as the maker of some particular kind of automobile or piano merchandises his particular product.

It is not the object of this article to argue the superiority of one of these classes above the others, but to point out that each has its own legitimate functions to perform. With which class do I, as an investor, want to do business? That depends entirely upon the kind of business I want to do. What do I want to buy—some particular kind of public-service bond? Assuredly, in that case, it is reasonable to go to a house that makes a specialty of that class of security. Am I, on the other hand, but ill-posted on investment matters and really not capable of deciding whether my money ought to go into shares or bonds or what? Assuredly, in that case, what I need is service—absolutely disinterested advice—and the logical thing to do is to go to a firm that has it to sell.

Having been landed with some fake mining or oil stock put out by people who couldn't safely show their faces south of the old Byrnes's dead-line, it is quite the thing these days to blame it on "Wall Street," when, as a matter of fact, it is to the class of houses having nothing but service to sell that the great majority of Stock Exchange houses belong. With all the tendency toward the establishment of bond departments to "carry" and merchandise bonds as do the bankers, what proportion of the firms which are members of the Exchange are tied up to any particular security or kind of security? A very small proportion indeed. You come across a house here and there that has got itself interested in this proposition or that, but in the great majority of cases Stock Exchange firms are free to render their customers disinterested service. Here's the market—here we are too, ready to buy you anything you say. We're brokers pure and simple. Commission's the same whether you buy industrials or railroads, whether the cost of the shares is $20 or $200.

"Nothing to sell but service"—it is doubtful if there is anything like general appreciation of the favorable position to handle investment business any house that can truly say that is in. With no axe to grind, no particular securities to sell, such a house can approach with an open mind the investment problems of each of its clients. This man is in a position where he can take more or less risk with his money—this or that particular stock is what he ought to buy. With some other client absolute safety is the primary consideration—for him only the best bonds will do. Each case on its particular merits; suitability above everything else. That is the way a broker can handle his customers' business when he, personally, has no financial interest in what they do. Let it mean dollars and cents to him to have them buy one thing rather than another, and—well, human nature is human nature.

Very wrong, therefore, is the idea that because a house does not engage in the business of merchandising securities its business is all speculative. On the contrary, there are so many people who will not invest money through houses which they know have a stake in any part of the market, that many firms which would otherwise go in for this kind of business feel constrained to keep out of it. In most people's minds the term "banker" is more closely associated with the conservative investment of money than the term "broker," and yet of the two it is the broker who is usually in the better position to plan a given investment in a scientific and perfectly unbiased way. His own interest doesn't enter into the matter at all. It is simply a question of what will be best for his client.

And very carefully indeed does the reputable brokerage house attend to the investment of its client's money. Walk into the office and order the purchase or sale of some particular stock, and the transaction will be put through, probably, without question or comment. State, on the other hand, that you have a certain sum of money to invest and that you want advice as to how to invest it, and, in the majority of cases, even where the total involved is small, no amount of trouble is too great for the house to take. That is its business, to sell service. If the service you want is simply the execution of an order in some particular stock, the broker will sell you that. If the service you want involves advice and a scheme for investing the money with full investigation of the securities proposed, the broker will sell you that—*and at no higher charge than if you merely asked him to execute an order on the Exchange.*

A woman investor whose experience had been all with real-estate mortgages recently came into the office of one of the firms whose advertisement appears in this issue, and stated that she wanted to invest $5,000. For upward of two hours two members of the firm discussed the matter with her, the final selection being five bonds of high grade. Taking out her checkbook and preparing to write a check, the client asked how much she should add for the "consultation fee." Six dollars and twenty-five cents, they told her, was the amount of the commission. "Six-twenty-five!" the woman cried. "Why, if the lawyer who sent me around here had done this much work for me he would have charged me at least two hundred and fifty dollars! Very much surprised indeed was this client to learn that under the rules of the Exchange one-eighth of one per cent. was all that was charged, whether the service rendered took much or little time and whether it occasioned much or little trouble.

How can the broker afford to sell service at such a rate? Simply because it is a rate that applies to *all* the business he does, investment and otherwise. A man comes in and buys and sells a hundred shares of steel, all within five minutes. On that the one-eighth commission amounts to $25. The next man who comes in wants to buy two hundred steel for investment. To this client, palpably, the firm can give more than $25 worth of service without going behind on the two transactions put together. And so the day's business averages up, the easily earned commission's from speculative business making possible an investment service at a charge much lower than would otherwise be possible.

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Mathematician Figures Out the Food Question.

If any one requires a clear head it is a teacher of mathematics. He must reason in the abstract, as it were, and full concentration of mind is necessary if correct results are to be forthcoming.

An Ohio man writes:

"I am a teacher of mathematics, and for 15 years prior to four years ago, I either took a lunch composed of cold sandwiches, pickles, etc., to school or hurried home and quickly ate a hot dinner.

"The result was that I went to my afternoon work feeling heavy, dull of brain and generally out of sorts. Finally I learned about Grape-Nuts food and began to use it for my noon-day lunch.

"From the first I experienced a great change for the better. The heavy, unpleasant feeling and sour stomach caused by the former diet disappeared. The drowsy languor and disinclination to work soon gave way to a brightness and vim in my afternoon work, a feeling entirely new to me.

"My brain responds promptly to the requirements put upon it, and what is of more importance, the results have been lasting and more satisfactory, the longer I have used Grape-Nuts as a food.

"My wife had been suffering from weak stomach accompanied by sick headaches nearly all her life. She is invariably relieved of these when she sticks to Grape-Nuts, either eaten dry or with milk. Her stomach has gradually grown stronger and her headaches less frequent since she began to eat Grape-Nuts." "There's a Reason." Name given by Postum Co., Battle Creek, Mich. Read the booklet, "The Road to Wellville," in pkgs.

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By LIEUT.-GEN'L CHAFFEE, U. S. Army

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-MADE AT KEY WEST-

Kansas City as an Investment Center

By Herbert P. Wright

KANSAS CITY as an investment center has not yet arrived. Every city in the process of its growth has to adapt itself to constantly changing conditions. The growth of Kansas City has been wonderfully rapid. Its increase in population has probably been as swift as that of any other city and its building has been remarkably substantial and consequently expensive. Where most young cities have built of wood, Kansas City has built of stone, brick, and cement. Where most cities have built their residences in a congested way on small lots, Kansas City has built on large lots with well-kept lawns. The location of the city is exceedingly rough, being full of hills and hollows. The leveling up of this ground has been tremendously expensive. These facts have undoubtedly tended to interest the citizens of Kansas City largely in real estate and the things that go with it. It has tended to make the most popular investments for the time being either those in improved real estate or loans on real estate owned by others.

Another popular form of investment in Kansas City has been farm loans in the Western country and the ownership of farm lands. Kansas City is not yet a manufacturing city. Its horizon is the agricultural country to the west, south, and southwest. Its attention is fixed much more on the condition of the crops of wheat, corn, alfalfa, and cotton than it is on the changing of quotations on the New York Stock Exchange. It is easy to see why the Western man who has acquired an accumulation sufficient to entitle him to be called an investor has naturally taken to the line of securities with which he is most familiar. The accumulation of lendable wealth in Kansas City in the last few years has been very large, but its owners have naturally been inclined to lend it out on real estate in the city and on farms in Missouri, Kansas, Oklahoma, and Texas, and on the cattle in those states, instead of investing it in the bonds which are popular with the Eastern banks. Bond-dealers everywhere recognize that the first impulse of a new investor is to look only for safety for his investment. After he has become somewhat familiar with the operation he recognizes that the ideal investment must be convertible as well, and invariably there will be a change in the class of investments which he seeks. Communities act precisely like individuals. Kansas City is just entering into that period of experience where the character of investments is changing. It is beginning to call for high grade, long-time investments that possess the elements of immediate convertibility at all times.

There is a large amount of real investment money in Kansas City awaiting its owners' education along conservative lines. In a very few years Kansas City will be as fruitful a market for the bond-dealers as Milwaukee, Detroit, Cleveland, or Cincinnati. The old familiar outlets for investment in Kansas City are becoming fewer as the money available for investment is increasing. The choice farm loans in Kansas, Oklahoma, and Missouri, which formerly came to this city, are now being taken up quickly by local investors at home, and the aggregate of this kind of loans is very much smaller than it was ten years ago. Consequently the investment funds are taking a decided turn toward bonds and high-grade stock investments. The experience of Kansas City is going to be the same as that of all of the cities farther East, where the type of investments has had to change in keeping with the evolution of conditions in the city itself and the tributary territory. The class of investments in Ohio and Michigan, both for banks and for individuals, has changed radically in the last twenty years—partly because the investments once popular are no longer available, and partly on account of a better understanding of the science of investments which can only come from a broader experience in handling them. A close observer will see the same change now taking place in Kansas City.

There is probably no city in the country that at this time offers a better opening for a branch office of a strong Eastern bond-house than Kansas City. The limited resources of the houses now engaged in the business are not sufficient to carry on a campaign of education such as the market justifies. Some strong Eastern bond-house with a high reputation will find Kansas City a very responsive place for a dignified branch office in charge of a resident manager. Occasional visits from traveling salesmen will not answer the purpose—the result will be attained only by establishing a permanent and dignified organization equipped to carry on a campaign of education and to build up a clientèle based on intimate personal and permanent acquaintance.

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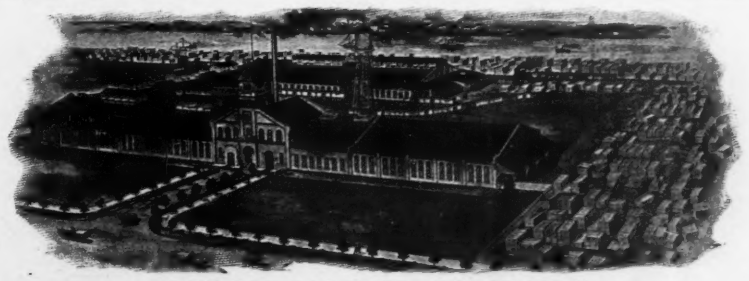

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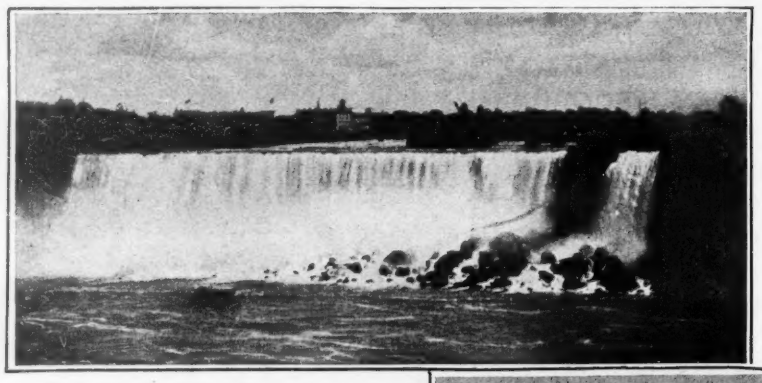
THE FAITH AND COURAGE OF THE PIONEER

WHEN, in the year 1890, the excavation of the tunnel of The Niagara Falls Power Company was begun there was skepticism on the part of many engineers and experts, as well as the public, of the successful outcome of the venture. Obviously it was an undertaking that would require the investment of millions of dollars and several years' patient waiting before construction could be advanced to such a point that the most sanguine of stockholders might hope for dividend returns. No water turbines to use large volumes of water at high pressure had yet been constructed in this country or abroad. In Switzerland and in France were a few isolated plants utilizing the high heads of mountain streams, but they were of small powers and hardly beyond the experimental stage.

It was generally believed that but a small amount of power could be marketed at Niagara, and accordingly the bulk of the energy proposed to be developed must be transmitted for distribution and use in Buffalo and beyond, the ultimate goal in the minds of the sanguine being the city of New York. There was, however, no universally recognized standard



American Falls, 1876

method of long-distance transmission. In England energy was transmitted considerable distances by the hydraulic-pressure method devised by Sir William Armstrong; at Schaffhausen, Switzerland, steel ropes and pulleys were used; and at various other places on the Continent the compressed-air method was in vogue. Electricity in the form of direct current had begun to be used in a few instances for trolley and motor services with short-distance transmissions, and alternating current a few years before had been brought into use for lighting purposes; but there was no standard method of electrical long-distance transmission for large volumes of energy to be used for general industrial purposes. In 1890 so eminent an engineer and electrical expert as George Westinghouse advised the directors of The Niagara Falls Power Company that transmission as far as Buffalo by electricity would not be feasible and that a method of transmission by compressed air must be adopted. Sir William Thompson (later Lord Kelvin) advised the company that a system of alternating-current generation and transmission would be impracticable for the purpose intended and it would be necessary to install direct-current generators. In the light of experience even the non-technically instructed now know that either of the methods so suggested would have proved inefficient and uneconomical.

Seven years after he had advised against an alternating-current installation Lord Kelvin visited the plant, a considerable part of which had then been completed and was in successful operation, and in the visitors' register referred to the plant as "a result of courageous undertaking and originality of invention and skillful design and construction."

All through the centuries the torrent of the Niagara carrying an average of 210,000 cubic feet of water per second down a fall of 326 feet between Lake Erie and Lake Ontario, had plunged boisterously over the brink of the great cataract to lose in its dash into the chasm below its well-nigh inconceivable potentiality of upward of 6,000,000 horse-power; a potential capable of an amount of work equal to that performed by efficiently operated steam-driven engines consuming 80,000,000 tons of coal annually, and equal to the labor performed by 175,000,000 able-bodied men working in eight-hour shifts twenty-four hours of each day so long as the river shall continue to run.

To "harness" that mighty force for useful work and thereby save human effort and conserve the world's coal reserve had been the dream of manufacturers, mechanics, engineers, scientists, and conservationists for many years. The first practical attempt was made in the year 1725 by locating a water-driven sawmill near the upper rapids. Later several mills were built along the shore and one on Goat Island, using but a fraction of the available head. In 1847 Augustus Porter, one of the two brothers who originally were granted by the state of New York patents covering all the lands about the Falls, issued a formal plan which was carried out and completed in 1861 by Horace H. Day, who constructed an intake canal 35 feet wide and 8 feet deep, extending 4,400 feet from Port Day on the upper river to an excavated basin on the bluff a short distance below the Falls. On the margin of this basin in 1890 a few mills were being operated by low-powered turbines at heads of 12 to 20 feet, discharging their tail waters by short tunnels through the bank and thence down the slope of the gorge into the lower river. The Day project, however, did not prove a financial success in the hands of its original proprietors nor an encouragement to further similar attempts. In 1877, after the company had become insolvent, the property passed into the hands of Jacob Schoellkopf, who later, following the leadership of The Niagara Falls Power Company, made it an important and successful enterprise.

In 1876 Sir William Siemens, inventor of the dyna-

American and Canadian Falls, 1885

result, which may be carried to a great distance, through a large metallic conductor, and then be made to impart motion to electro-magnetic engines, to ignite the carbon points of electric lamps, or to effect the separation of metals from their combinations. A copper rod, three inches in diameter, would be capable of transmitting 1,000 horse-power a distance of, say, thirty miles, an amount sufficient to supply one-quarter of a million candle-power, which would suffice to illuminate a moderately sized town."

In the year 1885 in response to public demand that the Falls and their surroundings be preserved from vandalism and utilitarian desecration the state of New York instituted the New York State Niagara Reservation. Employed on the engineering features of that work was a practical public engineer, Mr. Thomas Evershed. The utilization of Niagara's power appealed to him as strongly as it had to the learned Dr. Siemens. He realized, however, that power-houses in the gorge or elsewhere in the near vicinity of the Falls would not be in keeping with the measure which the state was then taking to preserve the scenic features of Niagara. It was expressly to avoid the location of power-houses and factories in the gorge and near the Falls that he laid out a plan for the excavation of turbine pits nearly a mile and a half above the Falls, which should discharge their tail waters as inconspicuously as possible through a common tunnel extending at a depth of 200 feet beneath the city of Niagara Falls to a portal at the level of the lower river.

With abiding faith and dauntless courage the directors of The Niagara Falls Power Company adopted for the company's hydraulic works the essential features of the untried plan of Thomas Evershed, as later with as great faith and still greater courage, relying on expert technical advice as well as the personal investigations of members of the board made both at home and in Europe, they adopted the twenty-five-cycle alternating electric current generated by alternators driven by water turbines, both alternators and turbines being of untried designs and of a power many times in excess of that of any theretofore fabricated.

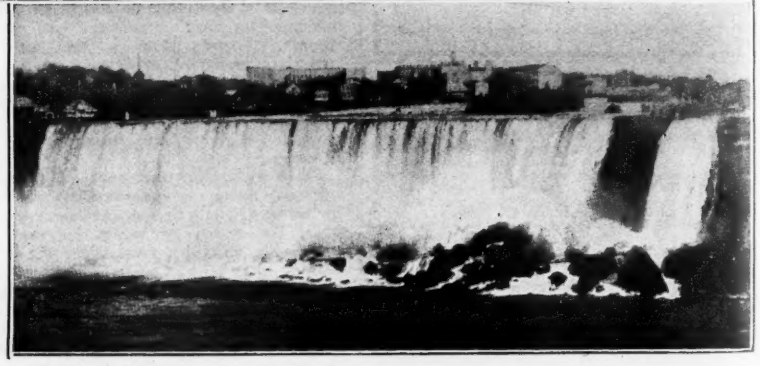
No turbine designs adequate for the purpose were to be had on this side of the Atlantic. The art of turbine-making seemed to be farthest advanced in Switzerland, though even there none had been built for more than 200 horse-power, while the necessary economies of the Niagara plan required units of 5,000 horse-power or upward. Faesch & Piccard, then the most experienced constructing engineers of Geneva, Switzerland, were intrusted with the commission. The first 5,000 horse-power turbine placed was designed and fabricated by that firm. The remaining nine turbines in Wheelpit No. 1 were made from the same design by an experienced firm of constructing engineers in this country. An improved design by Escher, Wyss & Company, of Zurich, Switzerland, was used for the turbines in Wheelpit No. 2. Recently an improved form of turbine considerably increasing the power of each unit was designed by Mr. C. C. Egbert, the hydraulic engineer of The Niagara Falls Power Company, and has been substituted for each of the ten turbines originally placed in Wheelpit No. 1.

Over a thousand men were engaged continuously for upward of three years in the construction of the tunnel. More than 300,000 tons of rock were excavated and 16,000,000 bricks used for its lining. The intake canal and the two wheel-pits, each some 450 feet in length, excavated from solid rock to a depth of 178 feet and surmounted by massive stone power-houses, were works whose construction was of corresponding difficulty and importance.

An initial installation of 10,000 horse-power was completed in 1895 and electric energy was delivered for use in the production of aluminum in electric furnaces of 1,000 horse-power units. Other services were soon supplied. Further generating units were installed and in the following year electricity was transmitted to Buffalo, that being the first instance of long-distance transmission of a large volume of alternating current to be used for commercial purposes.

The success of the Evershed hydraulic plan, the large unit generation, and the transmission and use of alternating current was complete, and the effect was immediate in stimulating the construction of hydro-electric development both at home and abroad. The era of the universal use of electric energy for power purposes had arrived. Hydro-electric developments quickly sprang up throughout Europe as well as in America.

The Day Canal and basin were enlarged, steel penstocks were placed to lead the water from the basin to turbines located more than 200 feet below, near the lower river level, and Niagara thereby was furnished with its second great power development of upward of 100,000 horse-power.



American Falls, 1888

Notwithstanding the anticipation of Dr. Siemens and the prophecies of other engineers and economists, upward of 200,000 horse-power of electricity now is in use within the city of Niagara Falls. That city already has become the most important center in this country for products of the electric furnace and the electrolytic cell. Many of these products which were unknown other than experimentally prior to the development of Niagara's power now have become indispensable to the world's comfort and convenience.

Niagara energy has come to be used in Buffalo, twenty-two miles away, almost exclusively for lighting and for the operation of its public utilities and generally for industrial use in factories; the use aggregating in December, 1912, about 72,000 horse-power. A large amount of Niagara power produced in the Canadian plants is transmitted also for distribution in Lockport, Rochester, Auburn, Syracuse, and intervening points.

The Niagara Falls Power Company was chartered in the year 1886 by an act of the legislature of the state of New York. In 1892 the legislature empowered that company to take from the Niagara River water sufficient for the generation of 200,000 horse-power in the plant as then designed. Criticism has been advanced of the small financial return reserved by the state for the grant as compared with the payments reserved by the Ontario government in charters later granted by it for power developments on the Canadian side of the river. The reservation or condition in the grant of The Niagara Falls Power Company was that it should continue to furnish free of charge all water used on the New York State Niagara Reservation and all electricity required for use for lighting or power in the buildings thereon. This condition has been liberally construed by the company and the services have been continuously rendered for years. At standard prices a compliance with this condition is now equivalent to a tax of about $6,000 per year. The companies on the Canadian side pay to the Ontario government fixed sums per horse-power for all power generated and used or otherwise disposed of. The amounts so paid by The Canadian Niagara Power Company are as follows: (1) a flat sum of $15,000 per annum; (2) in addition thereto payment at the rate of $1 per annum for each horse-power generated, used, and sold or disposed of over 10,000 horse-power up to 20,000 horse-power; (3) the further payment of 75 cents for each horse-power over 20,000 horse-power up to 30,000 horse-power; (4) the further payment of the sum of 50 cents for each horse-power in addition to 30,000 horse-power.

The plants of all the Canadian companies are located on park lands belonging to the Ontario government and the payments thus required to be made were reserved by the government as rentals for the occupation of the lands and their appurtenances. The American companies, however, are both located on private lands owned by them, to which under the established provisions of the common law there are appurtenant certain riparian rights, among which is the right to divert water opposite the shore lands for power purposes, returning the water to the stream at points opposite the owner's lands or, with the consent of all intervening owners, at points below. Taxes are paid by the American companies both to the state government and to the municipality of Niagara Falls, based on an assessment of such lands and their appurtenances. The taxes so paid by either of the American companies aggregate annually an amount far in excess of the aggregate amount paid by any one of the Canadian companies to the Ontario government both for the rentals referred to and for taxes.

Moreover, The Niagara Falls Power Company was chartered by the state of New York and was granted the said water rights at a time when the art of making such a development was in a state so crude that, in the sincere opinion of the writer of this article, based on an exact knowledge and careful study of all the facts of the case, the legislature of the state of New York, instead of requiring any payment by the pioneer company, would have been fully justified in establishing a bonus for the encouragement of the desirable experiment about to be undertaken at so large an investment and so great a risk on the part of the company's stockholders.

From the commencement of its undertaking The Niagara Falls Power Company, proceeding as rapidly as demands came for power, was constructing on one comprehensive plan a plant intended to develop all of the 200,000 horse-power permitted by its charter from the state. This plan provided for two tunnels, only one of which had been constructed when in 1906 Congress enacted the Burton law.

That law was the result of an agitation on the part of sincere and earnest Americans who feared that if all the authorized developments of power should be made the great cataract would be shorn of its grandeur and sublime beauty. There were at the time, as there are now, two generating companies on the American side of the river and three on the Canadian side. Several other charters, however, had been granted by the respective governments on either side of the river, and some of these seemed to permit unrestricted water diversion.

For the most part the unused charters were in the hands of promotors unsuccessfully seeking financial aid. While, doubtless, it is true that had all the projected plants been built and the water diverted to the extent permitted, there might have been a real peril to the Falls, as a matter of fact there never was any serious danger of such plants being built, with possibly a single exception. This was so because the existing plants occupied the only locations entirely feasible for economically taking water from above the Falls. They had been constructed for operation at the present river levels and, therefore, it is quite

Canadian Falls, 1900

American Falls, 1900

possible that the interference of several plants, each with the other's supply of water, would have furnished an automatic remedy for excessive diversion.

By its expressed terms the Burton law was intended to preserve for a period of three years the status then existing, so as to enable the United States to negotiate a treaty with Great Britain for the control of the amount of diversion to be permitted on either side of the river. Diversion on the American side was limited during the term of the law to an aggregate amount of 15,600 cubic feet of water per second, of which not to exceed 8,600 was to be permitted to be used by any one company.

The 8,600 c. f. s. limit was assumed by the sponsors of the law as the amount then in use by The Niagara Falls Power Company in the part of its plant then completed. This, however, was an erroneous assumption which during the continuance of the law and its renewals has compelled the company to close down machinery installed before the enactment of the law and in the beneficial service of supplying power for industrial use on the Niagara frontier. As a matter of fact, the proper and efficient operation of the present plant requires a daily diversion at a rate of from 10,000 to 10,500 c. f. s.

Although the Root-Bryce treaty was promulgated in 1910, nevertheless the term of the Burton law from time to time was renewed until its final expiration on March 4, 1913, by the failure of the Senate to adopt a joint resolution extending it for a further term of one year. Based upon careful investigation and reports by the engineers of the War Department, the Treaty Commissioners had limited to the rate of 20,000 c. f. s. on the American side and 36,000 c. f. s. on the Canadian side the amount of daily diversion which could be made without injury to Niagara. The rate fixed on the American side was, therefore, 4,400 c. f. s. greater than the maximum limit under the Burton law.

Calculations made from data embodied in the reports of the United States Lake Survey show that the transmission of 4,400 c. f. s. would have the following effects in lessening the depths of water of the Niagara River:

At the crest of the American Fall less than	1–8 inch
At the Goat Island end of the Horseshoe Fall, approximately	9–16 "
At the Canadian end of the Horseshoe Fall less than	1 7–16 "
At Lake Erie, approximately	1–5 "

American and Canadian Falls, 1905

That the present diversions have had no visible effect on the Falls is well understood by those who love the Falls and for years have been familiar with Niagara's many phases. Senate Document No. 105, Sixty-second Congress, first session, the report of the chief officer of the United States Lake Survey to the Chief of Engineers of the United States Army, and submitted by the President to Congress for its information, contains on page fifty-seven the following statement:

"It is only fair to state, because of some erroneous views held concerning the injury already wrought on the Falls by diversions, that during the past decade, 1899 to 1908, for the months of June to October, inclusive, the Falls have had a fullness of volume and consequent grandeur barely less than that of the prior decade, 1889 to 1898."

It will be of interest to add the following further extracts from the above report and from a similar report, H. R. Document No. 246, Sixty-second Congress, second session:

"It is determined that the total authorized diversion of the American companies, together with the present consumption of the Ontario Company, will lower the depth on the *American Falls about 5–8 inch* and decrease the volume of flow about 5 per cent. As the lowering will result in unwatering little if any of the crest line, and as the decreased flow will be *scarcely appreciable, it may be considered that the changes on the American Fall are unimportant.*"—*H. R. Doc. 246, page 12.*

"While the measurements of the Lake Survey have shown with certainty that changes in outflow of the Niagara River *have had no appreciable effect toward lowering Lake Erie in the past 10 years*, it is equally certain that Lake Erie has already been lowered 3 to 4 inches by reason of the diversion of water tributary to the Niagara River, through the Chicago, Welland, and Erie canals.

"In discussing the injurious effects of diversions at the Falls on Lake Erie and on the Niagara River as navigable waters of the United States and upon the scenic grandeur of Niagara Falls, other diversions of the water of the Great Lakes naturally tributary to the *Niagara River need consideration also, as the final injurious effect is the summation of all.*"—*Sen. Doc. 105, page 49.*

"It would be unjust to charge the power companies with a lowering of the river or lake that might be due to improvements for navigation or to some other cause. That these seasonable variations in the river regimen are present is also sufficient reason why conclusions drawn from cursory and incomplete river examinations might be viewed with suspicion."—*Id., page 25.*

"The interests of justice seem to demand the further statement that, in my opinion, the damage already done, and that which may be anticipated from further diversions and from the impending fall in the level of Lake Erie, may be largely, if not entirely, remedied by a submerged dam placed in the bed of the river immediately above the Horseshoe Fall. The dam, if properly planned, would serve to change the direction of flow so as to increase the streams that feed the Falls at Terrapin Point and at the Canadian shore. The decrease in the mighty volume that overflows the center or apex of the Horseshoe would not be noticeable. . . . A very direct result of the construction of this submerged dam would be a diminution in the rate of recession of the apex of the Horseshoe. This in itself is extremely desirable."—*Id., page 15.*

"While this report has dealt with injurious effects on the Rapids and Falls of the Niagara River and with interferences with navigable ways in river and lake, and has shown these up in their limiting, hurtful amounts, it seems proper to suggest certain remedial measures that may serve to harmonize the preservation inviolate of the scenic grandeur with the useful application of the splendid power of the Falls. *Both of these things are eminently desirable and feasible.*

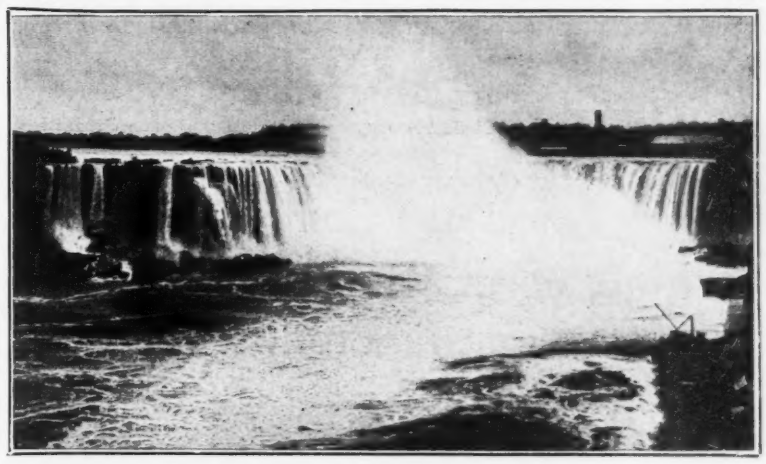
"A volume of 210,000 cubic feet per second with a descent between the "dead line" and the Upper Gorge of 220 feet has a potential of over 5,000,000 horse-power. This is the power of 15,000,000 strong draft horses, each limited to an eight-hour day. If it takes 10 able-bodied men to do the work of one of these draft horses, the work potential in this fall is that of 150,000,000 men, nearly twice our population of men, women, and children.

"The great companies at the Falls have created in good faith power plants to lessen the hardships of human labor, to aid transportation, to illumine the night hours, and to add to wealth of two nations. The power-houses for the most part are architecturally excellent, harmonizing with the scenic surroundings, and the mechanical wonders wrought in solving the engineering problems of the utilization of this great head and volume of water rival as a spectacle the scenic grandeur of the Falls and add to the attractiveness of the region.

"It therefore appears proper to permit and foster such ultimate developments in addition to those already in force as are compatible with the perpetuation of the scenic grandeur appreciably undiminished.

"Provided there be no large increase in up-lake diversions, the possibilities of continued and extended use of power at the Falls are conditioned upon the construction of regulating works in the Niagara River to avoid the wasteful outflow of the water of Lake Erie. The injury to the scenic grandeur of the Falls, and the interference with the navigable waters of the Niagara River and Lake Erie, due to up-take diversions, and the injury and interference coming from periods of drought would be largely obviated by impounding in the lakes a portion of the winter outflow. During the months of December to April, inclusive, enough water may be saved to hold the lakes to a proper and economical level to the betterment of navigation, and yield a surplusage to partially offset diversions at the Falls. This is a practical engineering proposition, but as the power companies are beneficiaries they should pay a fair share of the cost of the work."—*Id., page 75.*

"*The desirability, as well as the justice, of amending the Burton Act so as to permit The Niagara Falls Power Co. to divert water to the full capacity of its tail-race tunnel are plain.*"—*Id., page 139.* ***



Canadian Falls, 1910

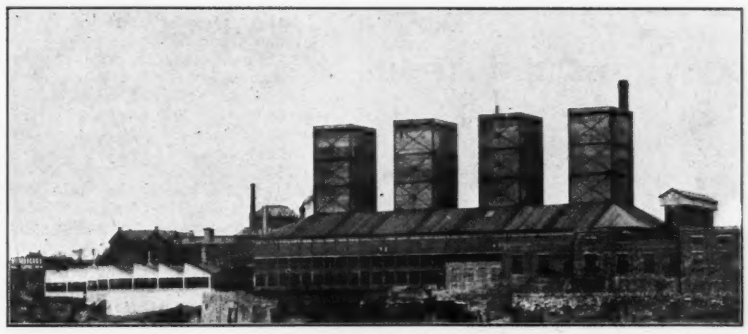
ALUMINUM COMPANY OF AMERICA

One of the Greatest Industries in this Country Has Extensive Quarters in Niagara Falls

The birth of the aluminum industry occurred in 1888, and since 1893 Niagara Falls has been the site for more or less of the active operations connected with its production. In the Aluminum Company of America our city has an organization that virtually gave to the world this metal commercially, and subsequently as new fields have been opened and new uses found for this material the Company has extended and improved its capacity here; has annually increased its output, has given employment to more and more people and become more and more a sound and important asset to this community.

Three reduction works and a rolling-mill are comprised in the plant operated here; thousands of electric horse-power are used and about eleven hundred men employed. In addition to its property in this city the Company has its general fabricating plant at New Kensington, a suburb of Pittsburg; alumina works of tremendous proportions at East St. Louis, a wire mill at Massena, N. Y.; an aluminum bronze powder mill at Dover, N. J.; and owns and operates mines in Georgia and Arkansas.

The engineering profession in the United States since 1899 has recognized the electrical conductivity of aluminum and copper as 61 and 98. In order, therefore, that an aluminum cable have an equal carrying capacity to a given size copper cable its cross-section must be 1.59 times as great. But the ratio of the weight of the two metals is as 3:3 to 1 and it is therefore a simple problem to determine the fact that an aluminum cable has only 48 per cent. of the weight of its copper equivalent. That is, forty-eight pounds of aluminum will replace one hundred pounds of copper in a line transmitting electrical energy, and it follows, therefore, that in order for a copper line and an aluminum line of the same capacity to cost the same amount the price of the aluminum must be exactly 2.1 times the price of copper per pound. As a matter of fact, however, this has not been the case for the past fifteen or sixteen years.



Works No. 3

During that time the price of aluminum has varied from 1.9 to 1.6 times the price of copper per pound, and therefore aluminum has not only the advantage in weight, but also the advantage of price over copper for transmission purposes.

The two most important lines installed in 1899 were the Snoqualmie Power Company's line, now called the Seattle & Tacoma Power Company, of forty-five miles, and the Northwestern Elevated Railroad Company's line in Chicago, which was installed at the time of the electrification of that railroad. Both of these aluminum installations are giving perfectly satisfactory service today and both have remained practically unchanged since their installation.

Today the majority of the important transmission lines are being designed for and equipped with aluminum. More than 75 per cent. of the power generated in Niagara Falls is distributed over aluminum cables, and many thousands of miles of it are to be found all over this country, carrying power from the sources of generation to factories, electric railways, lighting plants, and everywhere that electrical power is used to turn the wheels of industry.

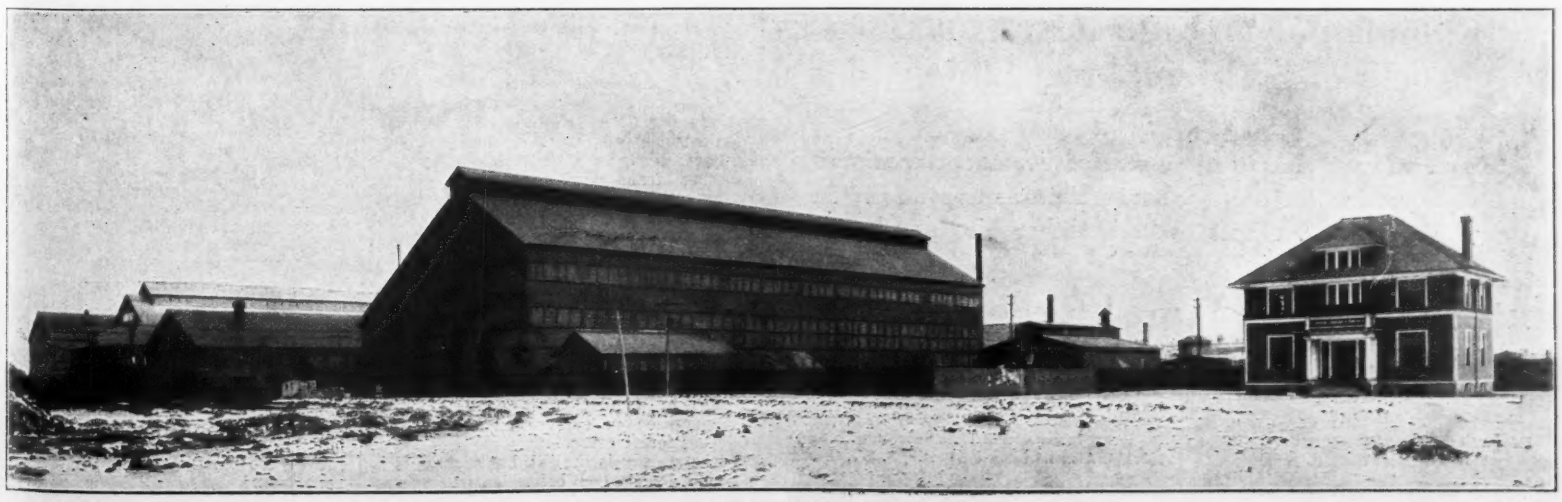
A large quantity of aluminum is made up into the form of tubing. It is possible to produce aluminum tubing so small that the fact that it is tubing is not discernible to the naked eye. Such tubing as this is used, of course, only for delicate instruments and the quantity manufactured is very small, but in the larger sizes—those sizes particularly which conform to standard iron pipe sizes, a very large quantity is produced. It is particularly employed where corrosive chemicals are used, and in even larger quantities in factories where fruit and food products are manufactured.

Countless household utensils are made of aluminum, and where implements of this material were formerly somewhat rare and in the nature of a novelty, the durability and attractive appearance of the material have earned for it an affection and confidence that are not shared with any of the other household furnishings. That it is light to handle, easily kept clean, and is bright and pleasing in appearance are some of the attributes of aluminum as they appeal to the domestic person. Moreover, it is impossible to produce a poison by uniting with aluminum any substance that is not itself a poison.

In 1890 a factory site was purchased at New Kensington and from the first this pioneer enterprise did a thriving business. In 1893 cheap electrical power attracted the Company to this city, and the growth of the plant here has been typical of the great development that has been effected generally by this progressive organization.

In 1889 a group of men, including Mr. Hall and headed by Alfred E. Hunt, a comparatively young man who was then engaged in conducting a chemical and metallurgical laboratory in Pittsburg, formed themselves into a company called the Pittsburg Reduction Company, subsequently changed to the Aluminum Company of America, whose object was the reduction and the fabrication of the metal aluminum.

Arthur V. Davis is the president and general manager of the Aluminum Company of America, and Charles M. Hall, who invented the commercializing method for the reduction of aluminum, is the vice-president. ***



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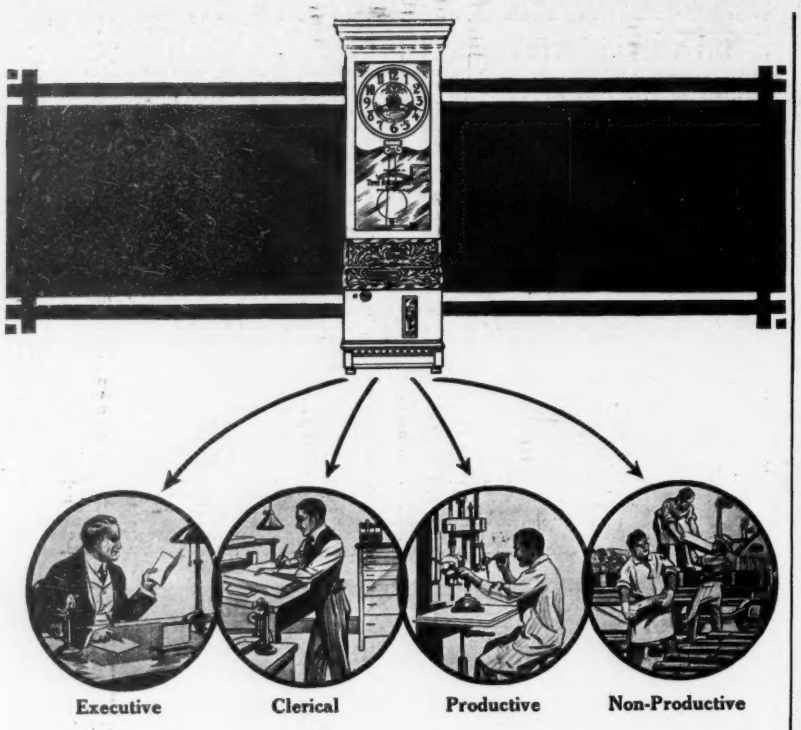

An Accurate Control of the Time of all Workers—Executive, Clerical, Productive and Non-Productive—

—Will Increase Your Capacity

—Reduce Your Time Losses

—Put You on a More Favorable Cost Basis

—Make Your Employes more Valuable to Themselves.

You can best secure this accurate control, increased capacity, and reduction of time losses with an

International Time- and Cost-Keeping System

A more favorable cost basis will follow as a matter of course; and your employes' value to themselves will be greatly increased when such time losses cease.

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We are always glad to show *precisely how* International equipment will bring about time-conservation in any line of business where labor is employed.

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To Save Our Timber

By Hartley Brandon

THE consumption of all varieties of lumber in 1880 was 18,000 million feet, and the per capita consumption was 360 feet. Since 1880, according to the government census returns of 1909, the population has increased 84 per cent., while the per capita consumption per annum has increased 47.7 per cent., resulting in a total annual increase in consumption of 172 per cent. These figures give, briefly, the principal reasons for the rapid increase in the price of lumber, while on the other hand, if we will consider the timber supply in relation to the production and consumption of lumber, the results are more startling.

The continual increase in consumption and the deforestation of timber lands, has resulted in a visible decrease in the supply of timber. As a result of the continued decrease in forested areas and increase in the demand for the product of lumber, the value of timber and its cost to the producer, and consequently to the consumer, has rapidly increased, with prospects of its further continuation until the last log has been manufactured into lumber.

This condition has not presented itself to the public until within the last five or six years, and the public mind is now directed to the future. What is going to be the result, and what the remedy? We find that in Austria, certain companies have been manufacturing from timber tracts for a period extending beyond two hundred years, and that every tree grown and every part of every tree is manufactured into lumber. These conditions are possible only because of the far-sighted policy of the Austrian government—not only the central government, but the provincial governments of the various sections of the country as well. The general forest policy of the Austrian government tends toward harmony with timber owners and conservation of forest resources, and, generally speaking, permits:

First, Trade agreements, which are legalized, and under which civil suits can be brought;

Second, They require the land to be reforested—*i. e.*, for every tree that is cut one must be planted;

Third, Reforested land is tax-free for a period of eighty-five years;

Fourth, Taxes are based on the output rather than on the land.

In this country the conditions are reversed. Trade agreements, in the first place, are forbidden by law, and are followed by disastrous results in case they are attempted, and in times of depression and over-production the result is declining values, when the small trees and top-logs, which produce the lower grades of lumber, are left in the woods to rot, for the reason that under these conditions they could be manufactured only at a loss. During the four years following the panic of 1907, this condition prevailed, and it is conservative to say that this resulted in the waste of at least 25 per cent. to 30 per cent. of the timber harvested during that period.

Owing to powers of the state governments and the policy of state rights, the federal government finds itself unable to pass any federal legislation to require reforestation, and it would be practically impossible to secure uniform state legislation, so that the producers of any one state would not be at a disadvantage when coming in competition with the producers of other states, by reason of such legislation. No such legislation should be enacted in the absence of legalized trade agreements.

It would appear that the only proper governmental policy to be pursued relative to the lumber industry is that every encouragement should be extended to reforestation of timber lands and the manufacture and conservation of the timber now growing thereon. This can be accomplished only by the permitting of trade agreements and the assessment of taxes on the timber as cut rather than on the land; otherwise our forests will be continually depleted, and there will be periods of waste in the woods by reason of inability to manufacture certain portions of the log at a profit, causing thereby marked increases in prices, which can only be overcome, as stated above, by permitting trade agreements that would allow a price to be placed on the material yielding at least the cost of production. This would prevent to a certain extent the rapid depletion of the forests and cause the trend of prices to be more slowly upward than it otherwise would be.

It is plainly indicated by the above that the principal elements entering into the present cost of producing lumber are due to improper legislation as opposed to economic laws and also to the rapid increase in population, creating increased consumption in every direction and depleting forest areas.

The remedy is limited, but such as it is should be applied before entire deforestation occurs.

Aluminum, Man's Marvelous Servant

WHEN the history of our age is written the story of aluminum is going to occupy a prominent page. It is quite as wonderful as the story of electricity, the all-pervading giant that lay hidden for ages in murky clouds, in masses of coal, copper, and soft iron, and in myriads of waterfalls, until Franklin and Morse and Edison put him in harness and made him one of the most useful and ingenious servants of man. The giant had lived among men during all the ages, yet had only killed them in storms—until the genius of our times set him a thousand tasks. So it was with aluminum, which constitutes nearly one-twelfth of the earth's crust, yet lay obscure and unsuspected through all the centuries until Sir Humphry Davy, in 1808, suggested that clay and many clayey rocks "depended upon some metal as a base."

Very slowly the scientists plodded on the trail. Woehlar in Germany twenty years later proved Davy's hypothesis correct. He first isolated aluminum by decomposing aluminum chloride by potassium and obtained it in the form of powder. Nearly twenty years passed before he produced it in little globules. Deville, a a French chemist, succeeded, in 1856, in producing the metal almost pure. Napoleon III. paid the expenses, and Deville put the metal on the market at $90 a pound. The ill-fated Prince Imperial had a rattle made of aluminum at that time. Aluminum was not popular, could not be at that price; though its lightness, cleanness, strength, and ductility made it exceedingly desirable. Scientists kept on plodding and the supply constantly increased, until in 1886 it was down to $9 a pound.

Charles M. Hall, newly graduated in 1886, from Oberlin University in Ohio, had the inspiration to try electrolysis rather than chemical action, and he was the first to reduce aluminum from alumina by combining the principles of the electric furnace with the electrolytic bath. He achieved a revolution. The price fell from eight dollars a pound to sixty-five cents a pound. To-day, thanks to further improvement, this marvelous metal, as clean and malleable as gold and as light as wood, costs less than twenty-five cents a pound, and is being used for thousands of purposes. But for the taming and harnessing of the parent giant, electricity, we should not be able to use aluminum today. The metal affords a classic example of the supply creating the demand, for its cheapness and wonderful qualities have called it into action all over the world.

All America is familiar with aluminum in cooking-utensils. Whoever has once tasted coffee made in an aluminum percolator will never have any other; for the metal is so pure and clean that the simplest sort of washing takes away every trace of the old grounds, and the next infusion flows from the percolator a fresh aromatic stream of exquisite taste and purity. Whether you bake, stew, roast or broil, the aluminum pot or pan or grill comes new and fresh to the task each time and at the minimum of labor in cleansing. Every bit of food thus prepared is at the perfection of natural flavor.

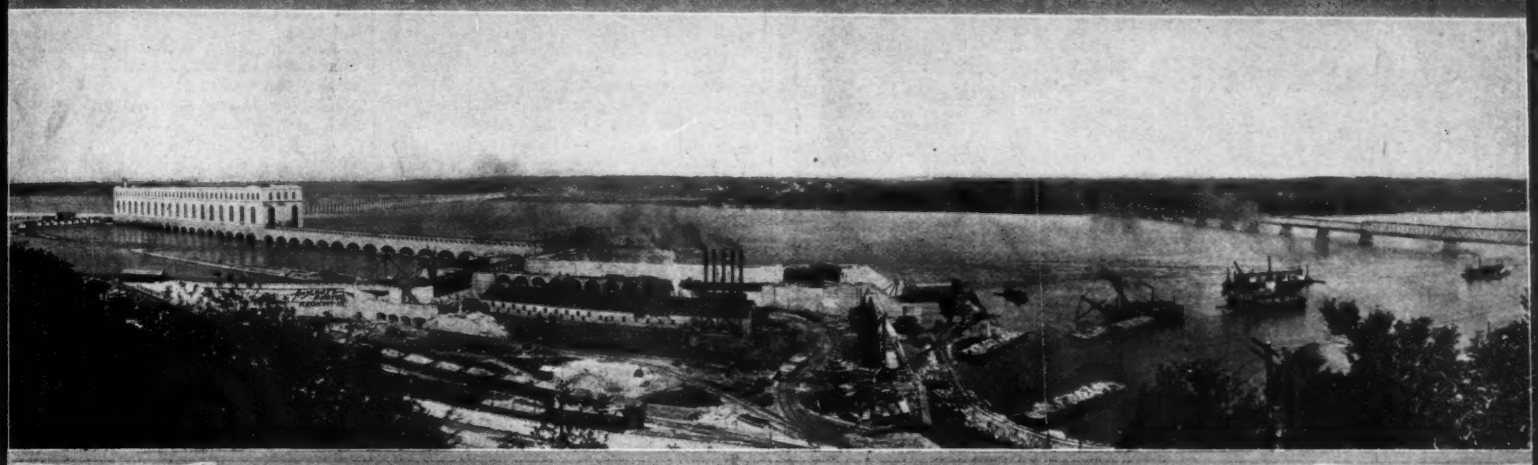
Those who have for years used iron, steel, or copper can hardly believe how much lighter and easier to handle aluminum is. Commander Peary took aluminum utensils with him to the North Pole. Lieutenant Shackleton carried them on his antarctic expedition. Colonel Roosevelt took them on his famed hunting trip in the African jungle, Wellman had them in his aerial voyage of one thousand miles over the Atlantic ocean. Most of the armies of Europe use aluminum utensils. Our own army uses some of them. In the war with Russia the Japanese used 150,000 aluminum mess-kettles.

But life is not all cooking. The cheap though precious metal is rapidly becoming so great a part of every-day life that a man shall spend every moment of the day within sight or touch of aluminum. The stuff is as omnipresent as air—and almost as necessary as life in this century is ordained. An enormous amount of aluminum is used in the manufacture of automobiles. Thousands of miles of wire and cables are used by interurban traction lines. The color, lightness, and sanitary qualities of aluminum have caused it to be used in the manufacture of cars such as are now in use in the subways of New York, and for the linings and racks of all modern railway cars.

What Fishes Know

THAT fish possess a certain power of reason is affirmed by many who have studied them. They often learn to recognize the voice of the one who feeds them. Fish will congregate in places where food is habitually thrown to them. If a morsel proves too large to be swallowed, they have been known to divide it on a sharp stone.

200,000 HORSE-POWER WATER-POWER PLANT, BUILT AT A COST OF $27,000,000 ON THE MISSISSIPPI RIVER AT KEOKUK



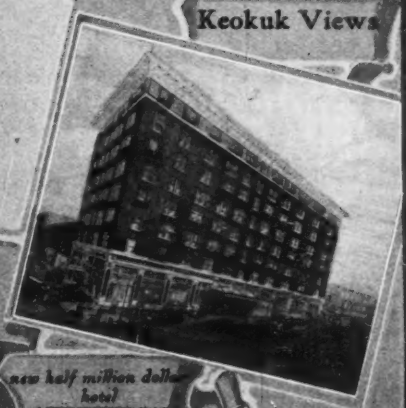
Power Plant Views

Government Lock and Dry Dock

The dam is nine-tenths of a mile long, 53 feet high and as wide as a street. The power-house is longer than five city blocks, and as high as a fifteen-story sky-scraper. This immense plant is one of the wonders of the United States.

Keokuk

Keokuk Views



new half million dollar hotel

The City For You to Live In To Build Your Factory In

THE middle west is the logical location for factories. Keokuk is the natural centre of manufacturing in the middle west, because—

1. Here is located the greatest power plant in the world, supplying constant power at the lowest cost.
2. Keokuk is situated on the Mississippi river, insuring low freight rates and the advantage of water transportation, which will in a few years be a most important consideration.
3. The city is high and dry, above any possibility of floods. A healthful and pleasant climate.
4. Keokuk has a new industrial zone set apart for factories, with special switching arrangements for prompt handling of in-coming and out-going shipments.
5. Keokuk Schools—Churches—Fire Department—Police Department—Parks—Clubs, etc., are all of the most modern in every way.

Views accompanying this advertisement show the Water-Power Plant during the construction period. By July 1, 1913, the plant will be generating power and the formal opening with appropriate celebration will be held in Keokuk, August 26, 1913.

Descriptive booklet and any special questions answered on request.

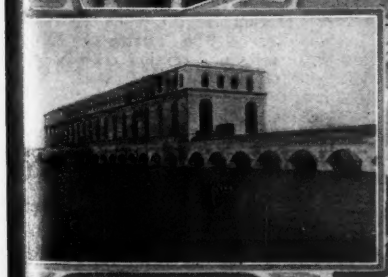
Address

Keokuk Industrial Association

KEOKUK, IOWA

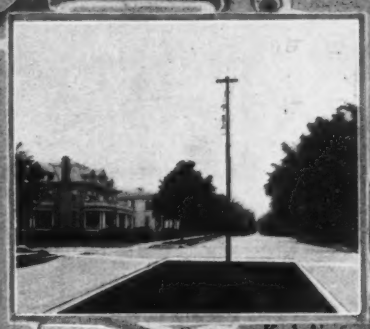
Generator room in power-house

Ice jam during construction period

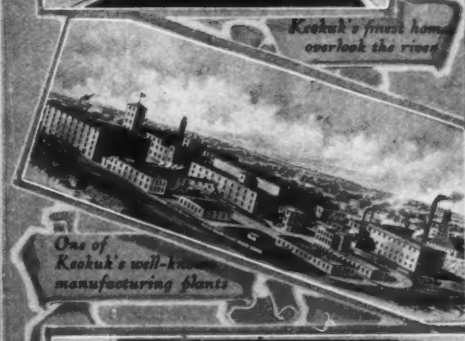


Close view of the mammoth power-house

Below the dam—flood gates open



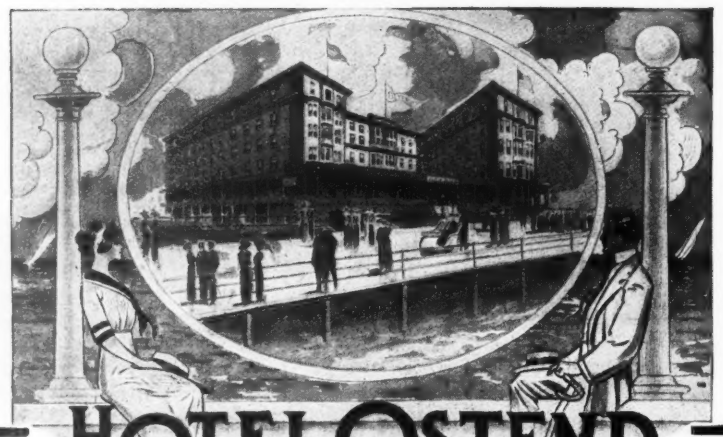
Keokuk's finest homes overlook the river



One of Keokuk's well-known manufacturing plants

The beautiful views from Keokuk's many parks are grand

One of Keokuk's many modern jobbing houses



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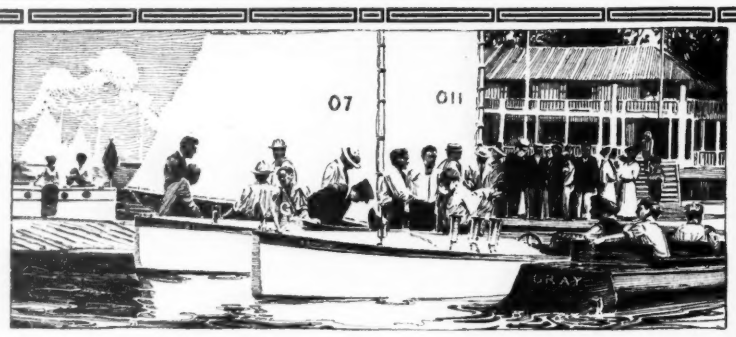

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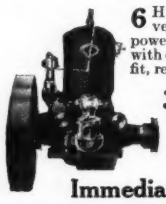

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Using Niagara's Power

BY EDWARD T. WILLIAMS

City Industrial Agent of Niagara Falls, N. Y.

THIS is the electrical era. In the past we have had the stone age, the ice age, etc.; but the electrical age is the period of the utilization of the strongest natural forces by the genius of man. In the last twenty-five years probably greater progress has been made in electrical power development than in any other sphere of human activity. This has been done by scientific conversion of power, represented in the flow of water, to an invisible current for almost everything that required power, light, or heat.

Naturally, the first development of electric power was at the source of the greatest quantity of power anywhere to be found on earth—the Falls of Niagara. For more than two centuries these cataracts had enjoyed a world-celebrity as a stupendous natural spectacle. The power-producing capacity of the great cataracts is estimated by the most eminent engineers at from 5,000,000 to 7,000,000 horse-power.

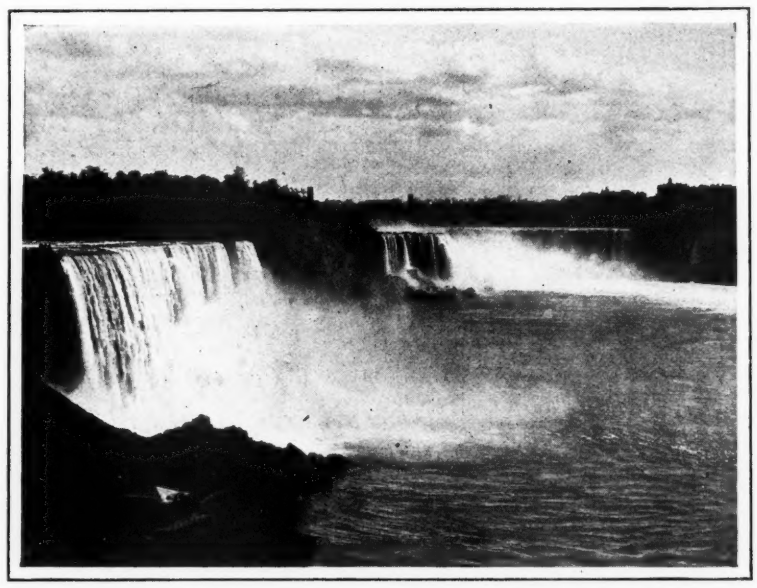
The potentiality of the Falls is explained by the fact that the Niagara River falls 300 feet in five miles, 50 feet in the upper rapids, 165 feet at the Falls, and 85 feet in the lower river. In its entire length of 36 miles the river falls 326 feet. The average flow of the river is 222,400 cubic feet per second. A flow of one cubic foot per second equals one square mile of water 1.16 inches deep in a thirty-day month. The flow of the Niagara River is furnished by 6,000 cubic miles of water from four lakes having 90,000 square miles of reservoir space.

Under the so-called Burton law the Niagara Falls Power Company was allowed a maximum diversion of 8,600 cubic feet per second; the Hydraulic Power Company 6,500 cubic feet per second; the Lockport Hydraulic Company 500 cubic feet per second; the Niagara Falls Power Company was allowed to import from Canada 52,500 horse-power; the Niagara Falls Electrical Transmission Company was allowed to export 46,000 electrical horse-power; the Ontario Power Company was allowed to export 60,000 electrical horse-power; the International Railway Company was allowed 1,500 electrical horse-power; making a total of 160,000 horse-power that could be imported from Canada into the United States. The Burton law was enacted June 29, 1906, and expired March 4, 1913. Now the only law governing the matter is the British-American treaty, which permits a daily diversion upon the American side of the river at the rate of 20,000 cubic feet per second; upon the Canadian side of the river at the rate of 36,000 cubic feet per second.

The electrical harnessing of the great cataracts has been of general and large benefit to the people of the United States. To the city of Niagara Falls and the Niagara frontier, it has been of stupendous import. As a result of it there are now located in Niagara Falls two manufacturing concerns which are the largest power-users in the world. As a matter of fact, there are several products that are almost exclusively made with Niagara current at the source of the supply, and they are in general use everywhere. Through great electric furnaces the magic current from the great cataracts has made Niagara Falls the chemical manufacturing center of the United States, and these processes would be impossible without great quantities of electric current; it has made the manufacture of abrasives a great commercial success and these products now enter into nearly every manufacturing industry.

According to a statement made to the Committee on Foreign Affairs of the House of Representatives by the president of the Niagara Falls Power Company, that company has expended $24,500,000 at Niagara Falls, New York, and Niagara Falls, Ontario. The United States government report shows that in 1906 this company had made expenditures of nearly $15,500,000, and that its allied and tenant companies, the latter being manufacturing concerns, had expended an additional $12,250,000.

At the same time the Hydraulic Power Company had expended nearly $6,650,000, and its allied or dependent companies had made an investment of over $8,000,000, an aggregate of nearly $42,000,000 for both power companies. At that time the two power companies were using 13,000 cubic feet of water, which would make each cubic foot of water taken represent an investment of $3,048. This statement, of course, does not include the three power plants at Niagara Falls, Ontario, one of which is an auxiliary of the Niagara Falls Power Company, and the investment in which is included in that company's total investment of $24,500,000.



A view of the American and Canadian Falls 1913

Now, as to the question of diversion and its effects upon the scenic grandeur of Niagara Falls. The average flow of the Niagara River is 222,400 cubic feet per second. To be conservative, the United States engineers sometimes use 210,000 cubic feet per second as the amount. The variations are caused largely by the direction of the wind on Lake Erie. Ice conditions in winter sometimes make a material difference in the flow for a few hours.

The Burton law permitted a total diversion on the American side of the river of 15,600 cubic feet per second, and an importation from Canada of 160,000 horse-power. The British-American treaty permits a diversion on the American side of 20,000 cubic feet per second, and it is contended by those most familiar with the situation that neither the Congress of the United States nor the legislature of the state of New York should impose any restrictions less than those imposed by the international treaty which was negotiated after a careful investigation by the International Waterways Commission, a body appointed under a statute of the United States to confer with a similar body appointed under a statute of Canada, to make recommendations with reference to the control and government of the waters of the Great Lakes and the valley of the St. Lawrence with reference to the question of the amount of water which could be withdrawn on the American and Canadian side of the Niagara River without material injury to the cataracts as one of the great natural beauties of the world.

When William H. Taft was Secretary of War it was his duty to deal with this matter, and he came to Niagara Falls, held a hearing at which all the parties interested were represented, and he announced that he had reached the conclusion that with a diversion of 15,600 cubic feet on the American side, and the transmission of 160,000 horse-power from the Canadian side, the scenic grandeur of the Falls was not effected substantially or perceptibly to the eye.

And the passage of the years has confirmed this conclusion.

Niagara in Romance and in Commerce

Glimpses of the Pioneer Days and of the Twentieth Century Development of the Niagara Frontier

BY EDWARD T. WILLIAMS

City Industrial Agent, Niagara Falls, New York

THE first white man to see Niagara Falls was Father Louis Hennepin, a French missionary, in 1678. He came to this locality with Father La Salle, who built the *Griffon*, the first vessel to sail the upper lakes, on the shore of the Niagara River just above Niagara Falls, where there is now a thrifty village bearing the name of La Salle. Thus romantically began a commerce which is now of tremendous proportions, which moves the products of the great West more than a thousand miles through the Great Lakes, the Welland Canal, and the St. Lawrence River to the sea by one route, and through the Erie Canal by another route after breaking cargo at the foot of Lake Erie or at the Tonawandas on the Niagara River, where is located sixteen miles from Niagara Falls and eleven miles from the spot where La Salle built the *Griffon*, now marked with boulder and tablet, the largest lumber market in the world.

One of the earliest descriptions of Niagara Falls was written in English, a letter from Peter Kalm, a gentleman of Sweden, to a friend in Philadelphia, sent from Albany under date of September 2, 1750. "When you are at the Fall and look up the river, you may see that the river above the Fall is everywhere exceeding steep, almost as the side of a hill. When all of this water comes to the very Fall, there it throws itself down perpendicular! It is beyond all belief the surprise when you see this; I cannot with words express how amazing it is! You cannot see it without being terrified; to behold so vast a quantity of water falling from a surprising height! I doubt not but that you have a desire to learn the exact height of this great Fall. Father Hennepin supposes it 600 feet perpendicular; but he has gained little credit in Canada; the name of honor they give him there is le grand menteur, or the great liar."

Francis Lynde Stetson, the eminent New York lawyer and vice-president of the Niagara Falls Power Company, recently said: "Since Father Ragenau, in 1648, wrote to his Father Superior concerning Niagara, 'A cataract of fearful height,' spectators by the million unconsciously have revealed something of themselves in various efforts to disclose to others the essential character of the Falls of Niagara, confessedly incomparable with any other natural object. To souls sensitive to the beautiful and the sublime, the plunging torrent has appealed by the stateliness of its stream, the brilliance of its boisterous rapids, and the deep glassy green of its silent foreboding brink, as well as by its drop into the seemingly infinite depths from which there comes to him who listens the note of the welcoming abyss, deeper than the diapason of any organ's pipe."

The state of New York, in 1885, established the State Reservation at Niagara by purchasing the land close to the Falls on the shore and the islands in the river, expending about $1,500,000 for that purpose and making this seventh wonder of the world free to all mankind forever as a spectacle. The next year Assemblyman Peter A. Porter, a member of the family that owned for many years the land around the Falls purchased by the state, passed through the legislature the franchise for the Niagara Falls Power Company, and thus the first steps were taken to revolutionize the region and inaugurate the electrical age.

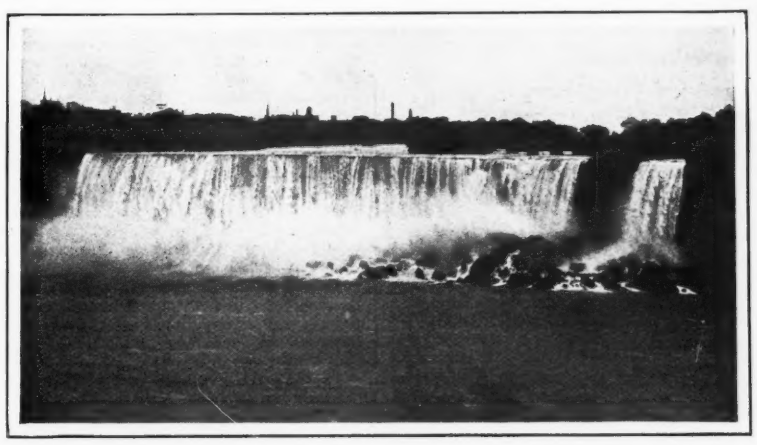
The charter of the Niagara Falls Power Company gave it the right to develop 120,000 electrical horse-power, and it was estimated that that amount of power exceeds the theoretical power at Lawrence, Holyoke, Lowell, Turners Falls, Manchester, Windsor Locks, Bellows Falls, and Cohoes, and exceeds the power actually developed at these places and at Augusta, Paterson, and Minneapolis.

Niagara electric power was first delivered commercially by the Niagara Falls Power Company, on August 26, 1895, the first customer being the Pittsburg Reduction Company, which has since changed its name to the Aluminum Company of America and which is now the largest power-user in the world, using 75,000 electric horse-power purchased from the two power companies, in three great plants here which last year produced 12,000 tons of aluminum, worth about $5,000,000. The Niagara Falls Power Company transmits considerable current to the cities of North Tonawanda, Tonawanda, and Buffalo, which operates many industrial establishments in those cities. It also furnishes the current for the International Railway Company, which operates 374 miles of electric railroad track on the Niagara frontier. On its lands on the upper river are the great chemical plants which have made Niagara Falls the chemical manufacturing center of the United States. The value of the chemical products in this city in 1909 was $11,996,726, which was 33.9 per cent. of the total for the industry in the state, and which also represented 41.9 per cent. of the total value of products for all manufacturing industries of the city combined.

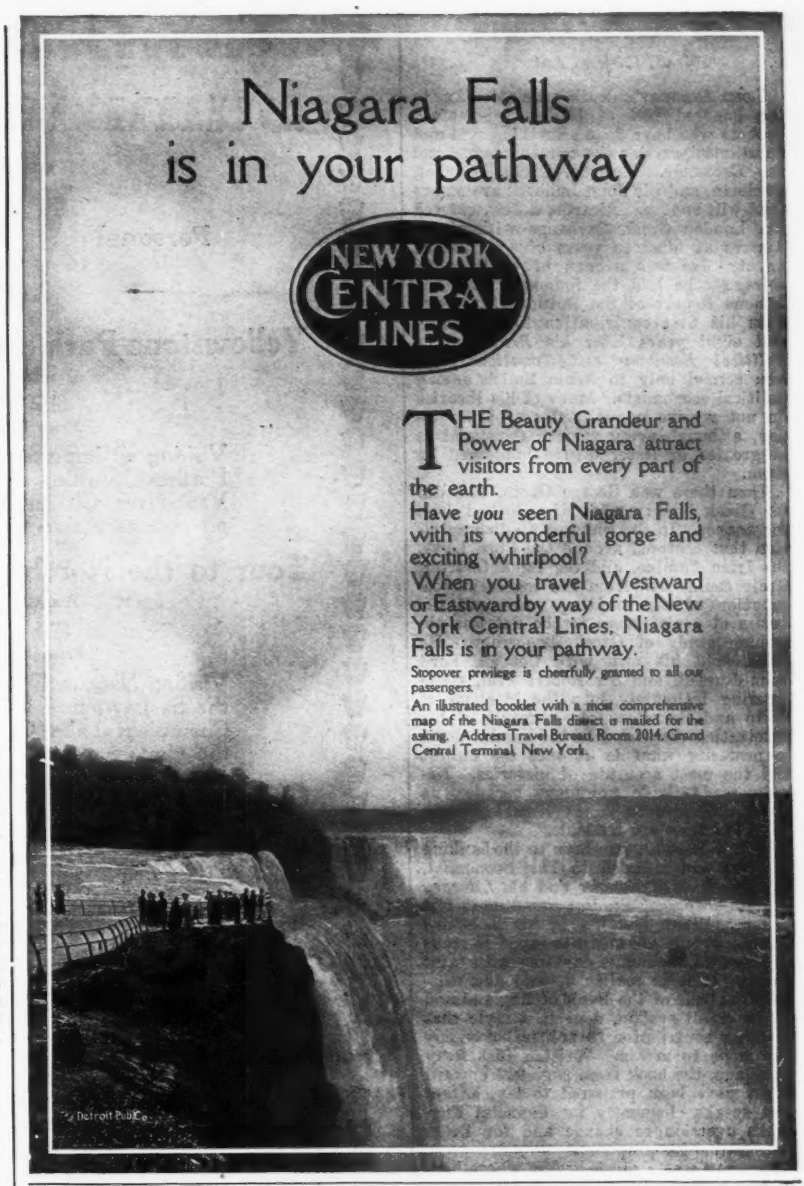
Furthermore, Niagara Falls far outranks all other cities of the United States in the manufacture of chemical substances by electrolytic processes, this branch of the chemical industry having developed very rapidly as a result of the utilization of the water-power of the Falls.

The Hydraulic Power Company, which had the original water-power canal in Niagara Falls before the dawn of the electrical era, widened and deepened it and began an electrical installation soon after the Niagara Falls Power Company did. It now has an equally great plant, two manufacturing districts in which are located many of the city's most important industries, and it does not transmit any of its current outside of the city.

When the first spadeful of dirt was turned for the excavation of the tunnel of the Niagara Falls Power Company twenty-two years ago, the present city of Niagara Falls was two villages with a population of less than 10,000. Now the city has at least 35,000 people. The assessed valuation of the territory was about $8,000,000. Now it is over $34,000,000. There was not a yard of pavement nor a foot of sewer in the territory. Now the city has seventy-eight miles of sewers, costing $1,377,000, and over forty-one miles of pavement, costing $2,000,000.



A view of the American Falls, 1913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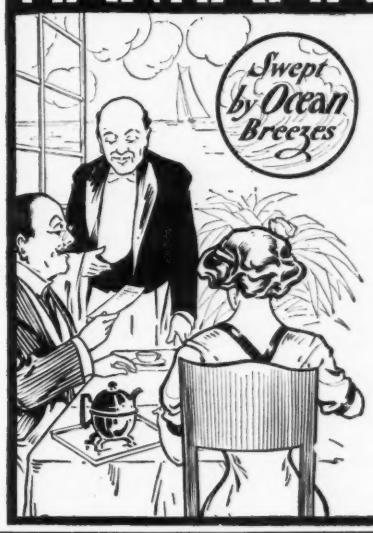

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Learned Stock Brokers

By W. C. Van Antwerp

LORD AVEBURY'S death calls attention to the honored roll of bankers and stock brokers who have done something real and substantial outside the counting-house and the Exchange. Ricardo, Grote, Bagehot, Stedman, and Sir John Lubbock are names that will endure. Ricardo, a Jew, entered the London Stock Exchange without resources at nineteen years of age, and at twenty-five was a man of wealth. At thirty-six he laid the foundation for the famous Report of the Bullion Committee with his first contribution to literature, and eight years later his *Principles of Political Economy and Taxation* place him second only to Adam Smith among political economists. Many of his theories do not receive unqualified acceptance to-day, although every modern economist is in greater or lesser degree influenced by them.

Then there was George Grote, who did for Greek history what Ricardo had done for finance. In the whirl of English agitation that centered around the Corn Laws, the Irish Famine, and the Bank Charter, Grote could turn from the engrossing occupation of the counting-room and the duties of a statesman to the not less absorbing study of Greek democracy. He could hold his own with Cobden, Lord John Russell, and Sir Robert Peel, while entering intimately into the idealism of Plato and Socrates. As a result of his penetrating researches he has handed down to posterity what is at once the dullest and the most accurate of histories. Nobody reads Grote nowadays because, as FitzGerald said to Fanny Kemble, "only lying histories are readable."

Walter Bagehot was born to the banking business and married to *The Economist*. His *Physics and Politics* and his *Literary and Biographical Studies* are almost forgotten. What remains is his *Lombard Street*. People are heard to say, "It reads like a novel," which is damning with faint praise. It is in reality a lucid and masterly analysis of the Bank of England and of the credit system, done in a style that no other contributor to political economy may hope to attain. Written just forty years ago, the book from page 210 onward might have been prepared to-day, a fact that speaks eloquently for financial England's aversion to change and for Bagehot's genius for prophecy.

Stedman was a stock broker whose honored career on the New York Stock Exchange ran the gamut of vicissitudes, yet in all the turbulent excitement of such a vocation he was poet, critic, and essayist, who saw sermons in stones and poems in running brooks. A lovable man of untroubled mind and exquisite refinement of poise, he could sing his *Lyrics and Idyls*, and ponder on *The Nature and Elements of Poetry*, while panics raged and men were tortured with anxiety. It was something inspiring to have on 'Change, after Lowell's death, the primate among American poets and critics—a man "of cheerful yesterdays and confident to-morrows."

Lord Avebury's biography has just been written in the notices of his death. What fires the imagination is his immense versatility. Hemmed in by what seem to be absorbing occupations, bankers and stock brokers who reflect upon this man's attainments may well pause in contemplation of the emptiness of their own. A banker at twenty-two and a Member of Parliament at twenty-four, the president of the London County Council, and the type of a wise legislator, this banker-statesman found time to learn all there was to know of social, educational, reformatory, and philanthropic problems, and of the fine arts and the science of medicine. He took pleasure in burrowing into drift gravels, caves, shell-heaps, and earth-mounds for that *Prehistoric Times* which must ever remain a standard text-book, and he found amusement and instruction in building causeways through the morass of antiquarian accumulation that finally resulted in his *Origin of Civilization*. Eighty busy years indeed! Years that have given to science the last word on ants, bees, and wasps; on the origin and metamorphosis of many obscure insects; on flowers, fruits, and leaves; on geology and physical geography. It is fortunate that no Sherman law can be invoked to limit mental attainment, and that the spirit of the labor union has not yet entered the domain of the laboratory and the library.

There is abundant opportunity to-day for stock brokers to utilize waste time, and to turn into valuable by-products some of the scrap-heap hours that are passed in idleness. Thanks to the useful educational work that the Stock Exchange and the press are doing, the public to-day knows more about the Exchange and its functions than it has known heretofore. There remains to be written a historical account of the origin of stock exchanges and their development into the perfect machinery of to-day. Much of this information is buried in contemporary records and lost in the old archives. Perhaps an author may be found on 'Change who will dig deep into this mine and condense into a live story a valuable contribution to stock-exchange literature. There are a hundred books on banking to one on stock exchanges. What is needed is something more than the worn-out simile between the Stock Exchange and a barometer. The fact that the Exchange is a nerve-center is also worn to the bone. The members, probably, and the public certainly, would learn much from a "human-interest" story of how and why stock brokers first appeared in England at the end of the seventeenth century; what William III. did to make securities popular with the masses; and how, even though repudiation was at an end, the government's obligations which supplied the counters for speculation were not as insecure as are the debts of a South-American republic of to-day.

It would be interesting, too, to trace the hostility to stock brokers which began with the earliest speculation in securities. There seems to have been an immediate antagonism between those who speculated and those who didn't. As there were no newspapers worthy of the name, it is perhaps natural that the stage, which was then the popular educational vehicle, should have resounded with wit and satire directed at this new vocation. One of these plays appeared as early as 1693, the very year which witnessed the first English government loan bought by the people for speculation and investment. Throughout the work of these old dramatists there is to be found a wealth of material that will give vitality to this study and throw much light on the ways and means of the pioneer stock brokers in London's coffee-houses and alleys.

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Financial Niagara

NEW YORK STATE divides its cities into three classes. Third-class cities include all whose population is under 50,000. Of the third-class cities in the state of New York, Niagara Falls, with an approximate population of 35,000, easily leads all others in the value of its manufactured products, as well as in the value added to the raw material by such manufacture.

Attracted by cheap power, foreign capital, and capital from Pittsburg, New York, Chicago, has been invested in large units in manufacturing near the seat of development of this power, with the result that the value of the products manufactured at Niagara Falls now approaches $40,000,000 per annum.

Before the impetus given to the city by the power development, banking business at Niagara Falls was somewhat attenuated, located, as the former village was, at a corner of the County of Niagara, and having no surrounding country from which business could be drawn. Banking then generally consisted of receiving small deposits in the summer from those engaged in catering to the tourist traffic, and of paying the money back to the same depositors for ordinary subsistence during the winter season.

In the earlier stages of the growth attendant upon the power development, banking business did not progress as rapidly as did population and industry, since the capital for the most part came from abroad, and those who invested in a large way at Niagara Falls continued their banking business at their own homes. Within recent years, however, this condition has changed and now the city boasts of five banking institutions, consisting of three banks of discount, one trust company, and one savings-bank, with combined assets of approximately $10,000,000.

The commercial banks of the city are very wide-awake institutions, and have shown on many occasions their willingness and capacity to extend all necessary banking facilities to worthy enterprises. Many of the institutions originally financed abroad have found the facilities offered by these commercial banks so superior that they have availed themselves of the assistance of the local banks and are warm in their praises of the business-like and efficient manner in which their business has been conducted.

In addition to these banking institutions, Niagara Falls takes pride in its loan association, which is one of the most successful and helpful in the State of New York. It has assets of over $1,500,000, all of which are used in assisting the home builder. It furnishes, at the same time, a secure investment for the savings of the worker.

The progress of the banks of this city has been exceedingly marked in the last five years, and the indications are that their growth in the next decade will be increasingly progressive. Manufacturers locating here are assured that in addition to the greatest and cheapest power in the country, the highest class of transportation facilities, and the possibility of avoiding objectionable tariff duties by having plants under a single management in both the United States and Canada, they will also find here available the very best of banking facilities.

ZENITH FURNACE COMPANY

A PARTIAL VIEW OF 2000 FOOT LOADING POCKETS, SHOWING INCLINE CONVEYOR.

In 1903 an organization was perfected at Duluth, having for its primary motive the manufacture of Bessemer and foundry pig iron, for the purpose of supplying the trade tributary to the Head of the Lakes.

Until the completion of the immense steel plant of the United States Steel Corporation, now under the process of construction upon the St. Louis River, a few miles beyond the location of the Zenith Furnace Company, the latter will enjoy the distinction of operating the only blast furnace on the South Shore of Lake Superior for producing coke iron, both Bessemer and Foundry.

The most serious obstacle confronting the enterprise at its inception was the inability to obtain high-grade coke at prices which were not prohibitive.

This problem was eventually satisfactorily solved by the installation of a battery of fifty by-product coke ovens.

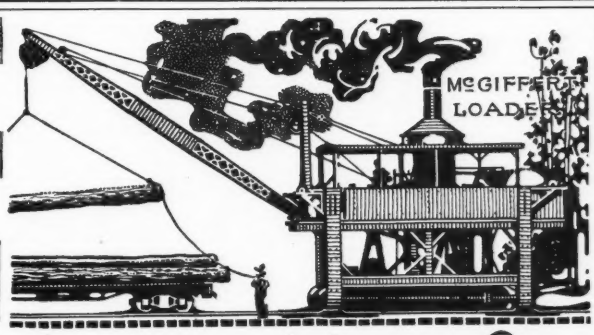
The daily consumption of this battery of ovens is about 375 tons of the highest quality of Youghiogheny gas coal screenings, producing about 260 tons of Bessemer coke for blast-furnace use.

The by-products are gas, which is supplied to the cities of Duluth and Superior for illuminating, cooking and heating purposes, and tar and ammonia.

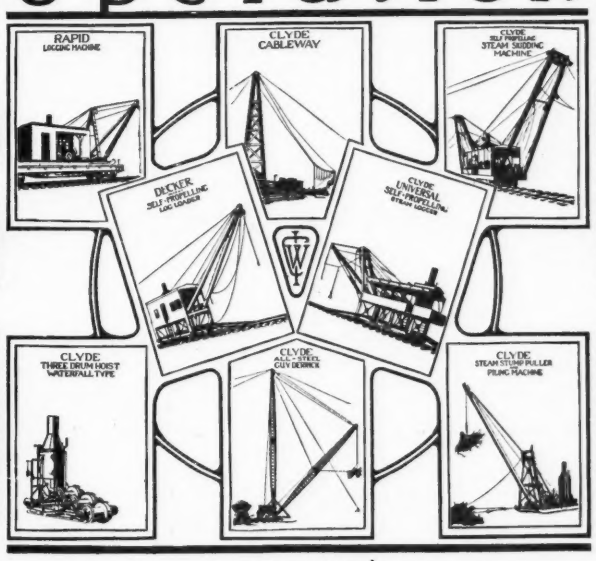
Only the purest thin vein Youghiogheny gas coal, mined in the Pittsburgh district, is suitable for the production of Zenith coke, and after the screenings are separated from the run of pile coal, which is received in cargo lots, the screened coal is sold to the steam and domestic trade in two sizes, which have long since become well and favorably known throughout the Northwest under the names of Zenith Lump and Zenith Stove coal.

The cleanest of preparation and promptness in filling shipping instructions have been specialties with the Zenith Furnace Company's dock organization, and to the latter end it operates its own terminal railway, in preference to depending upon the railroads for switching service.

The annual capacity of the Zenith Furnace Company now aggregates about 600,000 tons of coal, 100,000 tons of coke, 75,000 tons of pig iron, 700,000,000 cubic feet of gas, 600,000 pounds of ammonia and 1,200,000 gallons of tar.



A Machine for every logging operation



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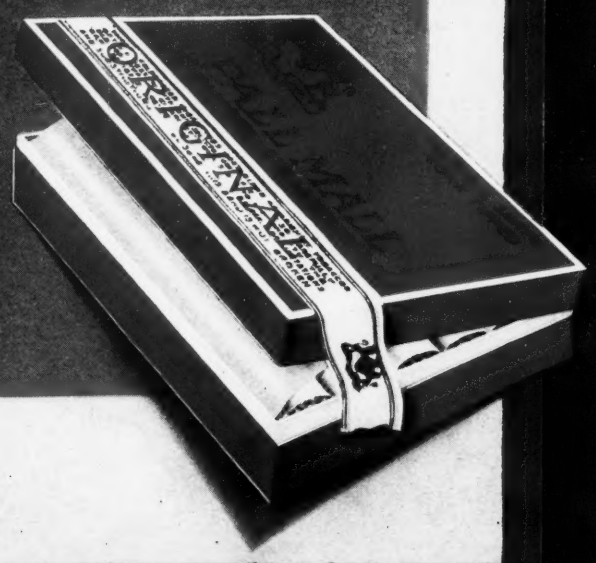

A Shilling in London
A Quarter Here